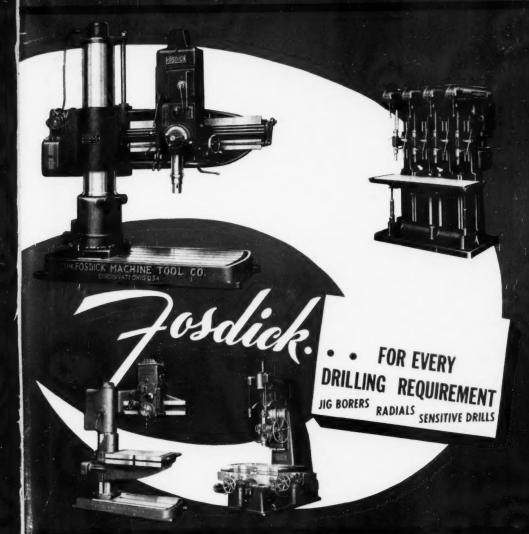
Modern Machine Shop



THE FOSDICK MACHINE TOOL CO.,

CINCINNATI, OHIO, U.S.A.



1709 RACINE STREET . RACINE, WISCONSIN, U. S. A.

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• The illustration shows a 3/8" diameter 24 pitch thread 2 3/6" long being cut on bar stock at approximately 400 pieces (800 threads) per hour, a 40% reduction over previous methods. Average production on this machine ranges from 500 to 2000 pieces per hr.

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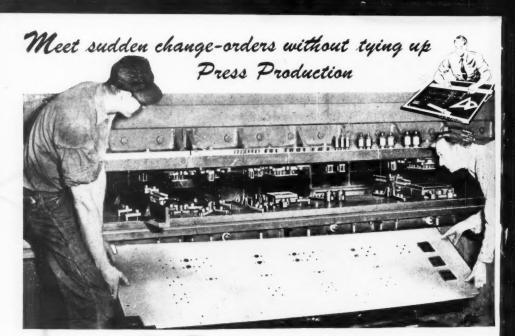
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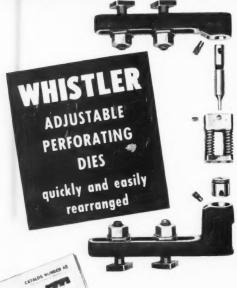
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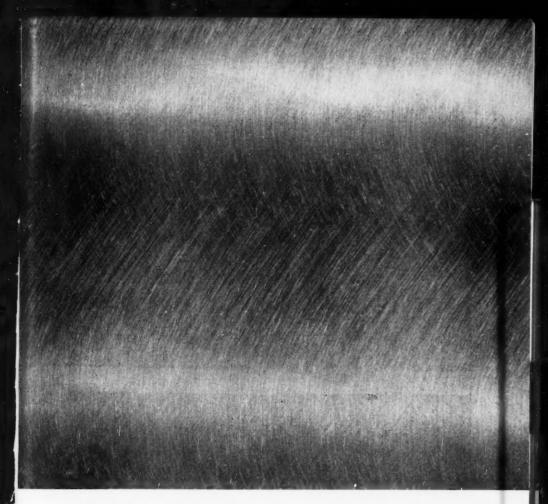




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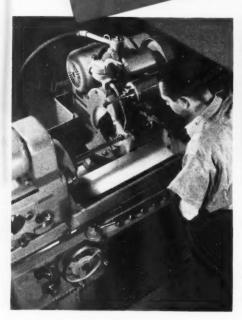
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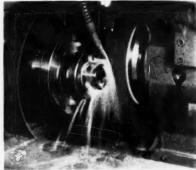


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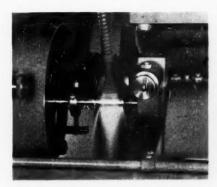




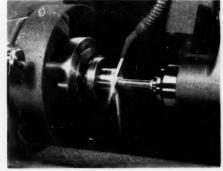
Above: Grinding the small diameter of a flanged bushing.

Left: Grinding the taper end of an aligning bar. Tapers up to $4\frac{1}{2}$ " per foot may be ground on CINCINNATI FILMATIC 10" Hydraulic Universals.

An exceptionally wide variety of small work can be precision ground to advantage on CINCINNATI FILMATIC 10" Hydraulic Universal Grinding Machines. Four examples are shown here. Machine features which expand the variety of work include hinged internal grinding head. The wheelhead may be swiveled more than 90 degrees, right and left. Headstock spindle speeds are instantly and infinitely variable from 60 to 600 rpm. A jog button stops the headstock spindle rotation where desired. To all these features of variety, add the advantages of FILMATIC Grinding Wheel Spindle Bearings (no adjustment or maintenance attention ever required) and you have a universal grinder which will be the best first choice for your shop... CINCINNATI FILMATIC 10" Hydraulic Universal. You may obtain additional information by writing for catalog G-577.



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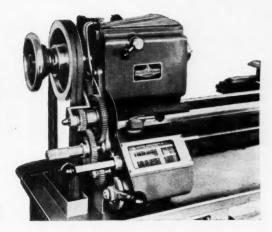
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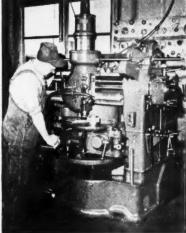
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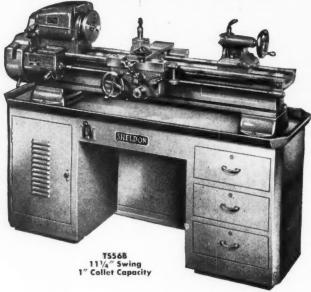
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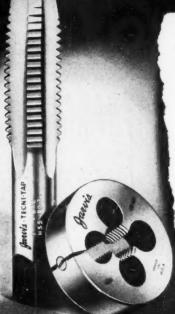
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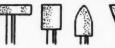
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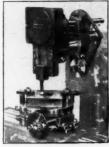
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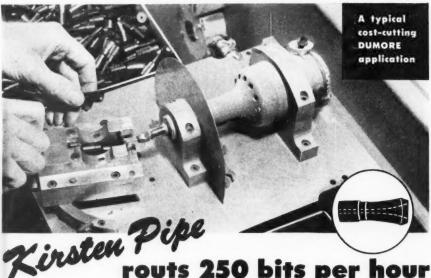
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"Dumore set-up is an ideal operation," says
G. S. McCarthy, Works Mgr.

Dissatisfied with production and quality obtained by conventional drill press operation on tapered smoke slots in hard rubber pipe bits, Kirsten Pipe Co., Seattle, devised the ingenious set-up pictured above. Vibrationless Series 10 Dumore handgrinder drives routing bit as work is pivoted on sliding ways of holding fixture. Spring in fixture ejects finished bit, and compresesed air connection keeps work and fixture clean. Cost per piece, with labor, is only $\frac{3}{4}$ ¢.

Sold on DUMORE Dependability-Accuracy

"We use a Series 7 on a bench lathe to sharpen broaches. This costs only \$500, where many plants buy a \$3000 machine. Our successful use of Series 7 and Series 10's led to purchase of Series 44 for tool room and general maintenance use."

Versatile Dumore Grinders can be applied in your plant, on your production, tool room and maintenance operations, for only a small fraction of the cost of highpriced production tools. Ask your Dumore Distributor to suggest applications, or write for literature to The DUMORE COMPANY, Dept. J-43, Racine, Wis.

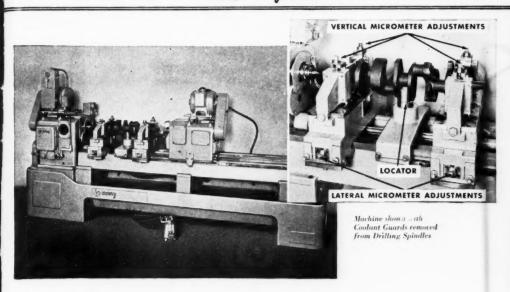


DH-2



MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK



MODEL "CS" AUTOMATIC CENTERING MACHINE CENTERS CRANKSHAFTS IN RELATION TO CENTER OF MASS BALANCE

Problem: Center automatically various types of crankshaft forgings in relation to center of mass balance.

Solution: The Model "CS" Automatic Drilling and Centering Machine selected for this job was equipped with special air operated vises having cross and vertical micrometer adjustment for the clamping jaws.

In operation, the first crankshaft forging of the lot is centered with all jaw adjustment dials set at zero. A crankshaft is then centered and tested for mass balance in a balancing machine, after which fine adjustments are made on the vise jaws. The machine is then ready to proceed with the centering operations on the run of a particular type of crankshaft.

Referring to the close-up view of the vises, note that each of the four jaws has independent vertical micrometer adjustment, while the cross or lateral adjustment is made with a single micrometer adjusting screw which operates the cross slide fitted to the body of the vise.

Located between the vises is a spring-operated locator which positions the crankshaft and maintains accurate depth of centering in relation to cheeks of one of the line bearings.

Engineered jobs are our specialty, and our staff is at your disposal to assist in solving your problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N.Y.

PRODUCTION COSTS ARE LOWER WITH So-swing



. . . DRILLS . . . BORES . . . CHAMFERS . . . AUTOMOBILE CYLINDER BLOCKS AUTOMATICALLY

In line with the growing trend toward equipment developed for specific job requirements,
 Morris has produced this automatic hydraulically controlled machine for drilling, boring and chamfering automotive cylinder blocks.

This machine has both left and right hand side heads plus a rear head and one angular head. Each side head contains one spindle, the rear head has five spindles and the angular head one spindle.

The cylinder blocks are fed to the machine by conveyor where a power elevator lifts and locates them in the fixture. A power clamping device locks them in the fixture ready for the tools to operate on the work piece.

Here's a modern method of producing volume production at low costs. Consult Morris on your high production work. They have the engineering experience—the plant facilities—and organization to help you reduce costs on high production work.





ROTOR NUT SETTERS PAY FOR THEMSELVES IN 10 DAYS

Job: Assembly of sink tops. Were using hand ratchet type screw drivers to set 1/4" square nuts -20 to a sink top.

Problem: To cut costs and improve product. To control tightness of nut-setting and avoid ripples in linoleum when back board and trim were pulled in place. Tools were tough on workers' hands. Called in the Rotor Application Engineer.

Results: Changed over to Rotor Midget Nut Setters. Output increased from 4 tops per hour to 16 tops per hour. 75% savings in assembly costs paid for the \$90 tools in 80 working hours.

Extraordinary? Not at all...and we'd be glad to tackle your portable tool problems—grinding, screw driving, sand ramming, buffing, or what have you!

Yours for lower costs,

AIR O'TOOL



THE ROTOR TOOL CO.

CLEVELAND, OHIO

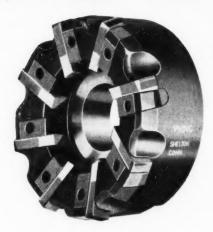




1 to here THE NEW VIKING CARBIDE **FACE MILLING CUTTER**

This brand new cutter combines the stock removal features of brazed-on and serrated-blade tipped cutters with the low reconditioning costs of inserted solid carbide type cutters.

The main feature of this new face mill is a large carbide tip with just sufficient steel backing to effect the addition of serrations to the back of the blade. The amount of steel brazed to the carbide is negligible and the heavy carbide tip remains the dominant material, thus eliminating the tendency of bi-metal cracking under thermal strains.



IMPORTANT FEATURES



- 1. Low initial cost
- 2. Longer blade life
- 3. Lower grinding (sharpening) cost
- 4. Easier reblading

WRITE FOR COMPLETE DETAILS.

Also Makers of The Viking Single Point Carbide Tool Holder





-FOREDOM HAS IT!

Which FLEXIBLE SHAFT
Machine is best for
YOUR SHOP requirements?

IT'S THE FOREDOM!

It's FOREDOM all the way! Because only Foredom is engineered to give the utmost in versatility and adaptability. With your choice of the 5 handpieces shown above, you get unexcelled adaptation to the particular job. You get finger-tip control. You get into those "hard-to-reach" places because of the small handpiece size. Remember, only Foredom gives you matchless adaptability . . it's your chance to use the right tool for the job. Foredom Machines, with their precision made handpiece, are teammates in Perfection. Extra good flexing qualities in the shaft assemblies provides deft, sensitive control of your work.



Precision Control

is yours on every job because the small-size handpiece KEEPS YOUR WORK WELL IN VIEW.









wrist-see arrow above.

FOREDOMS ARE TOPS FOR EVERY LIGHT GRINDING, FINISHING and DEBURRING JOB

Foredoms can be profitable additions to all THREE DEPARTMENTS—PRODUCTION, MAINTENANCE, and TOOL. There's no limit to Foredom's amazing adaptability in providing the right handpiece for the job. Every shop needs one or more! Quality tested for more than a quarter century, the FOREDOM line includes "hang-up" models as illustrated, and easy-portable bench models. Foot rheostat is standard with most of them. Motor driven models start at \$16.95. Also available are flexible shaft tools complete with handpieces for attachment to your own motor, drill press or electric drill at prices as low as \$5.95—ALL PRECISION BUILT. Get valuable information, send for our catalog No. B-2121.



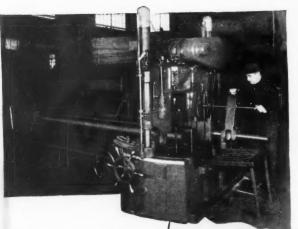
Foredom Electric Co., Dept. B-2121 27 Park Place, New York 7, N. Y.

Please send us your catalog No. B-2121, showing the different uses of Foredom Flexible Shaft Machines.

Name

Address

City & Zone State State



You can depend on MARVEL'S 53 years of leadership in both performance and service.

Metal sawing is MARVEL'S business. For 53 years MAR-VEL has worked exclusively on designing, developing and building better metal cutting band saws, hack saws and blades. As a result, MAR-VEL is uniquely qualified to give expert and unbiased analysis of all metal sawing and cuttingoff problems, and maintains a large and competent staff of MARVEL Field Engineers to make this service always and immediately available to you.

Write for Catalog C-48; contains a volume of metal sawing information.

ARMSTRONG-BLUM MFG. COMPANY

5700 Bloomingdale Avenue, Chicago 39, U. S. A.





For complete details, applications and accessories, write for NEW circular No. 1025

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PNEUMATIC TOOLS . UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS . MINING AND CONTRACTORS TOOLS

THIS IS IMPOSSIBLE

BUT A PEDRICK MACHINE DOES IT.



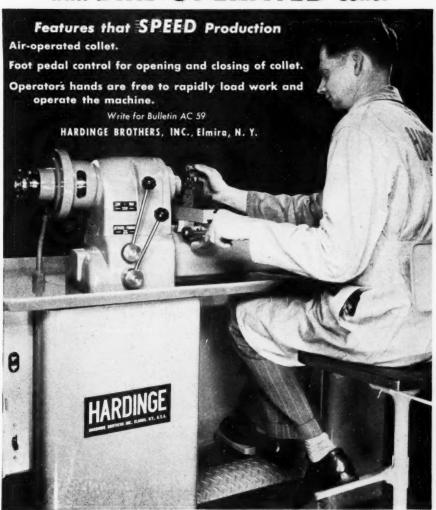
PEDRICK TOOL and MACHINE CO.

3643 N. Lawrence Street

Philadelphia 40, Pa.



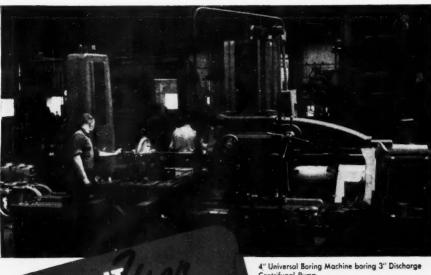
Precision Second Operation Machine with AIR-OPERATED Collet



OFFICES IN PRINCIPAL CITIES. EXPORT OFFICE: 269 Lafayette Street, New York 12, N. Y.

New Water-Saver Valve CUTS COOLANT COSTS! Instant Cut-Off Assured Now waste of expensive coolants can be eliminated . . . their use confined to required periods! The Ross "Water-Saver" or Time Delay Valve is the answer. It turns on. the coolant and lets it run when needed . . . then automatically shuts it off. The flow can be maintained for any period from 3 seconds to 3 minutes after the machine cycle. Operation of the valve is entirely automatic. No electrical or mechanical motivation is required since it is activated by cylinder pressure. The Water-Saver Valve is a straightway or shut-off model, normally open or closed to water supply, and is available in 1/4 to 11/4 pipe sizes. Get complete details today ... no obligation whatsoever. Rose maker valves only—hundreds of types and sizes. Take advantage of the experience galand in over a quarter contary of concentration on control and application of air power! Ask Ross for Any Air Control Information OSS OPERATING VALVE COMPANY

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Centrifugal Pump.

UNIVERSAL NOW.

BULLARD - Universal BORING, DRILLING and MILLING MACHINE . . .

Customer satisfaction is tested and here are the findings:

"Performance plus" is a user comment.

Another user states "We replace Universals with Universals."

Still another says "When we put a job on this tool, it comes off right. We had decided on another make but after seeing and studying Universal, we changed our minds."



Face milling massive section of Double-suction Pump.

One satisfied customer has used Universals since 1925. At present he has five in his plant, one recently purchased, two 10 years old, a fourth 16 years and the fifth with 18 to 20 years of service.

These comments, plus Bullard Proficiency in Engineering, are reasons why you should investigate and study Bullard-Universals for your shop. Write today for data on 3-4 and 5-inch spindle machines.

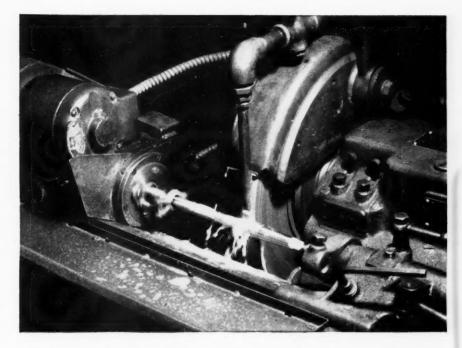
The Monthly Robertson Bulletin

CYLINDRICAL GRINDING IN THE TOOL ROOM

LOW PRODUCTION COSTS, as well as low tool costs, require that tools and cutters be kept sharp. Dull tools spoil work, slow up production, take too much power and often have to be discarded before their normal life is half over. Because very little stock has to be removed when tools are only slightly dull, frequent sharpening lengthens the life of the tool. Because total sharpening time is much less, it costs less to sharpen tools frequently.

The large variety of work to be ground in tool rooms—and the many types of metal used—demand a universal free-cutting wheel that will remove stock fast and give the desired high finish. Such a wheel is the Robertson "Cool-Cut." Its revolutionary "open" structure permits cool cutting even on the hardest metals, with finishes well above production standards.

Plug gages, punches, reamers and many other tools can be successfully ground on the cylindrical grinder with the use of



a Robertson RA605-KV wheel. Increases in production between grinds have run from 70 percent to as high as 400 percent. Several manufacturers report that it is the best all-round wheel they have ever used.

For faster and more accurate tool-grinding—for any grinding job, big or small, and especially the tough ones—specify Robertson. Whether they're vitrified or resin-bonded, Robertson Grinding Wheels enable you to buy production time.

ROBERTSON MANUFACTURING COMPANY

TRENTON 5, NEW JERSEY

Resin-Bonded and Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments





Grinders. Guesswork on close tolerance work is eliminated, spoilage losses are reduced, an unusually

high degree of accuracy is ensured, Rapid adjustment and coarse setting of the vertical wheel travel is obtained through a column hand wheel graduated in thousandths. A clutch permits instant engagement of the vernier feed attachment. Once the operation is completed, the same clutch

The Tatt-Peirce #1 Precision Grinder

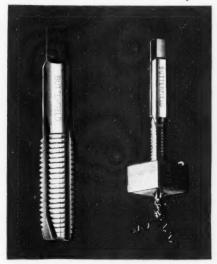
allows instant release of the fine feed. Available for new Taft-Peirce #1 Precision Surface Grinders and the 6" Rotary Grinder, this attachment also can be installed on older type machines. For further information see your nearest T-P representative or write directly to —



THE TAFT-PEIRCE MFG. CO.

WOONSOCKET, RHODE ISLAND

Let the chips fall either way!



CHIPS CURL DOWN and out of deep through holes when you use Burterfield Ground Thread Spiral Pointed Tops — right hand crut, left hand spiral points. No chip clogging in the flutes. These tops also recommended for blind holes when drilled deeply enough to allow clearance for chips of bottom of hole.



CHIPS SPIRAL UP and out of blind holes that have little or no chip room at the bottom when you use Butterfield Ground Thread Spiral Fluted Tops — right hand cut, right hand spiral flutes. Flutes are milled to the correct degree of spiral allowing tap to cut freely while ejecting chips from hole.

INSIST ON BUTTERFIELD GROUND THREAD TAPS

Whether you want to tap blind holes or through holes, there's a Butterfield Tap to meet your need... to cut smooth, accurate threads in aluminum, magnesium, brass, copper, zinc and similar materials What's more, because they're Butterfield, you get extra assurance of top performance, maximum savings in time and money Every Butterfield Tap is individually inspected. These taps, too, are ground thread—providing maximum accuracy and savings by fewer wasted threaded parts.

For quick deliveries, depend on your nearby Butterfield Distributor. Union Twist Drill Company, BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec.

BUTTERFIELD THE 100% INSPECTED TOOLS

Every Tool Individually Inspected

TAPS . DIES . REAMERS . SCREWPLATES



Hole Grinding Problems

CAN YOU



TWO-STATION DIE BLOCK

All holes ground to exact size and location. Blank hole and center piercing hole ground with one half degree included taper. Little clearance permissible between punch and die. 2% hrs. on the Moore Jig Grinder.







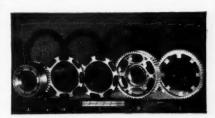
TEN HOLES IN MASTER PLATES

Hardening distortion corrected in two plates. Ground to size and location independently and to plug gage fit in any of the four possible positions. 31/2 hrs. on the Moore Jig Grinder.



HAVE YOU BOUGHT YOUR COPY OF "PRECISION HOLE LOCATION"?

An entire chapter of this authoritative hand book on toolmaking practices is devoted to an engineered solution to the problem of correctengineered solution to the problem of correcting holes by Jig grinding. Over 5,000 copies have been sold to date. Available at special price of \$3 in U.S.A.; \$3.50 outside U.S.A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport 7, Conn.



FIVE ACCESSORY GEARS IN MASS-PRODUCTION

Gear A: Eight holes on circle ground to size and location within ±.0003"...Gears B, C, D, E: Radii at ends of elongated pockets ground to size and location within ±.0003"...Gears

B, C: Radii ground to shoulder near bottom of pocket within ±.0005". With special indexing fixture, 4 aircraft engine gears per hour finished on the Moore Jig Grinder



"Correcting Hole Location Within Less Thon .0001" is the title of our new 28-page catalog which describes the operation and applications of the Moore Jig Grinder to dies, drill jigs, gage parts, master plates and production parts. Write for your copy today. MOORE SPECIAL TOOL CO., INC. +730 UNION AVENUE, BRIDGEPORT 7, CONN.



TO YOUR TOOLROOM

IIG BORERS DIE FLIPPERS

JIG GRINDERS HOLE LOCATION ACCESSORIES PANTO-CRUSH WHEEL DRESSERS



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OVER 80,000 NOW IN STOCK

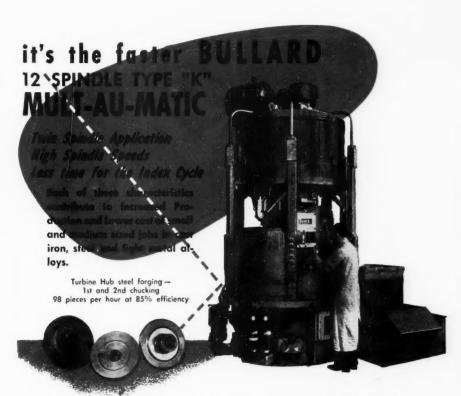
There are important advantages in bringing your sprocket requirements to Cullman Wheel. Chief among these is the fact that in fifty-five years of specialization in the design and manufacture of sprockets and kindred power transmission parts, has built up the amazing total of over eighty thousand sprockets in stock. Invariably your requirements can be met quickly from this great sprocket and chain inventory. This always brings the cost down. Quick delivery is also available at Cullman on special made to order sprockets. Send your blue prints for recommendations and estimates.

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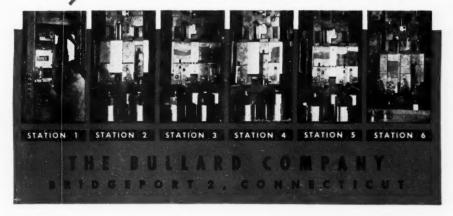
CULLMAN WHEEL COMPANY

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Setfing The Pace for Manufacturing Economies

There are 19 operations combined in the 1st and 2nd chuckings. Each index of the machine delivers a finished piece. When writing for information refer to ad XK



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Index Pawl Carriers stamped from .094" steel at 175 spm in Bliss No. 645 Presses. How IBM clicks
off short-run
stampings on
BLISS

Automatics

BM

IBM Electric Typewriters and precision electric punched card accounting machines contain over 1500 different parts produced on Bliss High-Production Presses.

Two key levers are stamped out of .040" steel at each stroke of a Bliss No. 620 Press.

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY IN THE WORLD

Quick die changeover speeds output of 1500 different parts...production increased 25-30%

Die changeover is really simple on Bliss High-Production Presses—takes less than 20 minutes per set-up at International Business Machine's Poughkeepsie, N. Y., plant. From there on it's clock-work. IBM attributes stamping production increases of 25-30% to this factor and to the reduced handling of automatic operation as compared to previous results with open back inclinable presses.

Turning out short production runs of over 1500 different parts during each quarterly manufacturing schedule is the job of five Bliss No. 620 and No. 645 High-Production Presses. Low-tolerance part runs for accounting machines may be as little as 3,000 per set-up.

Die Life Doubled...Die life has doubled for IBM since Bliss High-Production Presses were installed at war's end. With one 4-stage progressive die they've already stamped out between 3 and 5 million typewriter tab keys from .048" steel to tolerances of .001" or less in every dimension, without appreciable wear on the die. The most IBM had hoped for was 2 million parts, but the tab die is

still going strong. Because of their short runs, most other dies haven't approached that figure yet.

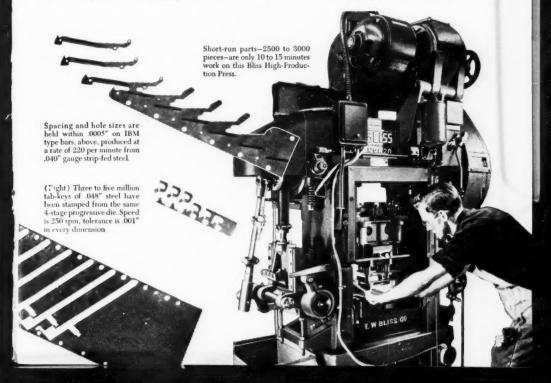
Hold Feeds to .003". With Bliss Automatics IBM is also able to hold feeds to .003" allowing the diemaker in his design to reduce material scrap.

For long or short runs, from coiled or strip-fed stock, Bliss High-Production Presses can spell economy and efficiency for you, too. You'll get dependable (IBM hasn't required outside service in four years), easy-to-operate equipment that makes possible maximum output for both man and machine. Automatic feeds, indexing and ejecting features are available as required. Our catalog 27-B gives full details. We'll gladly send it to you.

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WORKS AT: Toledo, Salem, Ohio; Hastings, Mich.; Derby, England; St. Ouen sur Seine, France • SALES OFFICES AT: Detroit, Mich.; New York, Rochester, N. Y.; Cleveland, Toledo, Salem, Ohio; Philadelphio, Pittsburgh, Pa.; Chicago, Ill.; New Hoven, Conn.; Windsor, Ont.



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Built to the same perfection as standard 4 ton Benchmaster.

Bronze bearings, adjustable ram gibs. Positive single trip safety mechanism or ram repeats simply by removing one screw.

Open-back, inclinable construction. Removable bolster plate.

The ideal low-cost press for all small parts manufacture! At your dealers now. See the new Benchmaster MIDGET!

Free circulars available - write today.

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GEST PRODUCER OF SMALL PUNCH

f.o.b. Los Angeles Less Motor

> APPROXIMATE SPEED 290 strokes per min. with 1725 rpm motor)

STROKE 3/4" Shorter strokes special order

DIE SPACE 3-3/4" maximum to

bolster plate,

ram up. THROAT DEPTH

BOLSTER PLATE

4" x 6" x 5/8", 1-3/4" center hole.

COWET-CG THE COOLER COOLANT



DETERGENCY PLUS PENETRATION

Ahcowet C G contains a combined detergent and wetting agent. It completely penetrates all grinding, cutting and working surfaces. Costly heat is dispersed quickly . . . lubrication is complete! Ahcowet is a product of New England's oldest industrial chemical company. Tested and proven in America's largest industrial plants.

AHCOWET CG MEANS -

FASTER PRODUCTION - rapid dispersion of heat gives faster, heaviercuts; closer tolerances; better finishes.

LOW COST - more suspended solids give longer tool life; fewer regrinds.

EASY TO USE-will not sour, is odorless and absolutely harmless to the skin. Tools and work kept free from sludge, dirt and clinkers.

ARNOLD, HOFFMAN & CO., INC.

Machine Tool Division

55 Canal Street, Providence, R. I.

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HYDRAULIC CONTROL FOR AIR-POWERED EQUIPMENT

IF YOU LIKE THE SPEED, FLEXIBILITY AND ECONOMY OF AIR-POWER, YET REQUIRE THE CONTROLLED SMOOTH-NESS ONLY HYDRAULICS CAN GIVE

BELLOWS HYDRO-CHECK IS THE ANSWER

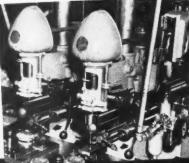
THE Hydro-Check is an adjustable hydraulic resistance unit used to control the piston movement of air cylinders or the movement of the machine which they power. It sets-up an opposed, steadying, fully adjustable resistance to the power thrust ... smooths out the natural bounce and springiness of air, yet in no way interferes with the flexibility and ready adaptability of air power.

The Bellows Hydro-Check may be used to check the movement of an air-powered piston or machine at any given point, or at a number of points; or it may be used to stop and re-start movement at one or more points in its travel.

 Write today for your free copy of the bulletin—"Hydraulic Checking of 'Controlled-Air-Power'." Address The Bellows Co., Dept. MMS-949, 222 W. Market St., Akron 9, Obio.



Hydro-Check controlled feeding assures better work quality and longer tool life in any metalcutting operation.



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Manufacturers of Air Cylinders, Air Motors, Air-Powered Feeding Devices, Air Collet Chucks, Air Vises and Air Hydraulic Vises and Air Operated Impact and Arbor Presses

INVESTIGATE Surface Broaching

FOR DIFFICULT MACHINING WORK

Throughout the metal working field
there are many parts that can
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savings over the costs of the present
machining method. The aircraft,
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and even sporting goods manufacturers have all found ways of
making parts faster, cheaper and
to finer tolerances through the
use of Footburt Surface Broaching
Machines. We will be glad to
work with you on the application
of surface broaching.

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Duplex Surface Broaching Machine. Made in 5, 10, 15 and 25 To:: Sizes.



Single Slide Surface Broaching Machine. Made in 5, (10, 15 and 25 Ton Sizes.



Continuous Type Machine. Made in 4 Sizes.



SURFACE BROACHING

A TIME TESTED LINE OF MACHINE TOOLS

CUT HEAVY and LIGHT STOCK Both

You don't have to adjust knife clear. ance on Niagara Power Squaring Shears every time you cut a different thickness of stock! Niagara capacity ratings are maximum capacity ratings, and they cut any thickness of stock up to their top rating WITH-OUT TINKERING WITH THE KNIFE ADJUSTMENT

And to prove it, look at the photograph at right...one man is cutting a 20 gage sheet and the other is cutting 5/8" plate BOTH AT THE

SAME TIME, AND WITH THE SAME KNIFE ADJUSTMENT, AND WITH THE SAME GOOD

RESULTS.

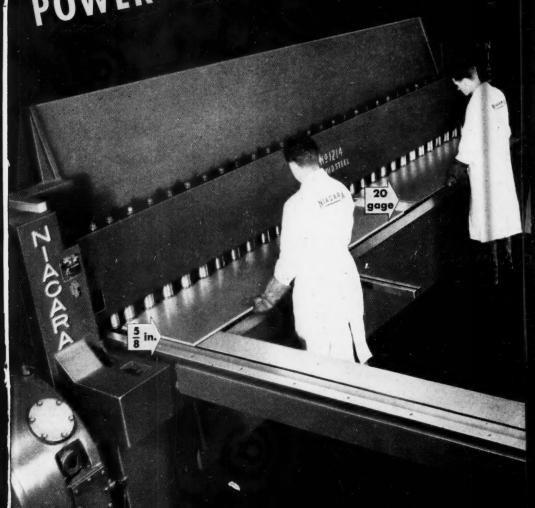
This is done daily in our own plant on our own work. We gladly dem-

It speaks for Niagara design, Niagara onstrate. rigidity, Niagara strength and the recognized ability of Niagara shears to deliver more working strokes per

Write for bulletin.

NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, NEW YORK DISTRICT OFFICES: DETROIT, CLEVELAND, NEW

at the Same Time on POWER SQUARING SHEARS



These sketches show a few of the many ways in which Hannifin Cylinders are used to PUSH . . . PULL . . . LIFT . . . PRESS . . . CLAMP . . . SQUEEZE.



Pneumatic Cylinders

do the work!

"AUTOMATION" is an interest-rousing new term that describes some of the many ways in which pneumatic cylinders are being used to actuate and power automatic work-saving devices. Hannifin is playing an important part in this development by supplying cylinders that are right for the job and engineering know-how second to none when it comes to applying cylinders to the job.

If you are interested in using cylinders to SAVE TIME...REDUCE PHYSICAL EFFORT...CUT COSTS...and IMPROVE PLANT

OPERATION, get in touch with HANNIFIN today. Engineering recommendations on request. Experienced Factory-trained field representatives in all leading industrial centers.



HANNIFIN CORPORATION

1135 South Kilbourn Avenue Chicago 24, Illinois

Take Quick. Accurate Inside Measurements

From 1/8 to 6 inches With These Two Lufkin Tools

 Skilled mechanics everywhere are finding the Lufkin Telescoping Gage and the Lufkin Small Hole Gage essential companion tools in the well-fitted efficient tool kit. They simplify the taking of difficult measurements, such as, measuring deep within the hub of a gear or small hole diameters where the use of an inside micrometer is impractical.

Notice these features which you will instantly recognize as important time and error savers.

THE LUFKIN TELESCOPING GAGE

An exclusive design feature is the double telescoping action of the plungers. As a result, the handle is always centered giving perfect balance and "feel"

JUFKIN Telescoping Gages and



Measurements down to one thousandth inch or less are taken from the gage with a Micrometer.



Each gage has its own handle sized in direct proportion to its plunger range. assuring perfect balance found in no similar gage

Available individually or in sets packed in a durable leatherette case. Range 'p to 6 inches.



New Small Hole Gages



Ideal companion tool for measuring small holes or slots below the inch range of the Telescoping Gage. Simply insert ball end in holeturn knurled knob until right "feel" is obtained - then measure ball end with Micrometer. Gages have ball ends flattened off close to center line which permits gaging shallow holes or grooves. Provision is also made whereby travel of the expanding cone is stopped at both the extreme open and closed limita

of the gage preventing breakage. Available individually in four different sizes, or as a complete set with range of 1 4 to 1 2 inch.

Write Dept. MM for fascinating booklet, "The Amazing Story of Measurement." Enclose 10c (no stamps) cover handling

and mailing



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PRECISION TOOLS . TAPES . RULES FROM YOUR DISTRIBUTOR

SAVE on your HEAT TREATING COSTS in your own plant!



HARDEN and TEMPER TOOLS . DIES

EFFICIENTLY • **ECONOMICALLY**

Now you can save money by heat treating your small parts, tools and dies in Sentry Electric Furnaces. Used with Sentry Diamond Blocks, the scientifically controlled neutral atmosphere will produce full hardness and uniformity of work with no reduction in size, no scale and no decarburization.

Easy to install, simple to operate, these Sentry Furnaces will quality harden any type of high speed or high carbon high chromium steel tools or dies at low production cost even with inexperienced help. For tool or production line, there is a Sentry Furnace to meet your particular requirement.

Write for descriptive catalog 1054-E8





The Sentry Company
FOXBORO, MASS., U.S.A.

Sentry DIAMOND 810 ck

Johansson Brown &

Johansson Gage Blocks now available through Brown & Sharpe Distributors

NEW CATALOG

Send for a copy of the latest catalog on the latest catalog all Johansson Gage all Johansson made by the contains detailed incontains detailed formation and illustrations.

These famous precision standards of industry are conveniently accessible through Brown & Sharpe Distributors. Thus, industry is assured a continuing dependable source of supply for JO-BLOCKS and Accessories.

With the purchase of the Johansson Division from Ford Motor Company, Brown & Sharpe acquired all rights to manufacture and distribute Johansson Gage Blocks and Accessories throughout the Western Hemisphere. Since that time, it has obtained the rights to world-wide distribution.

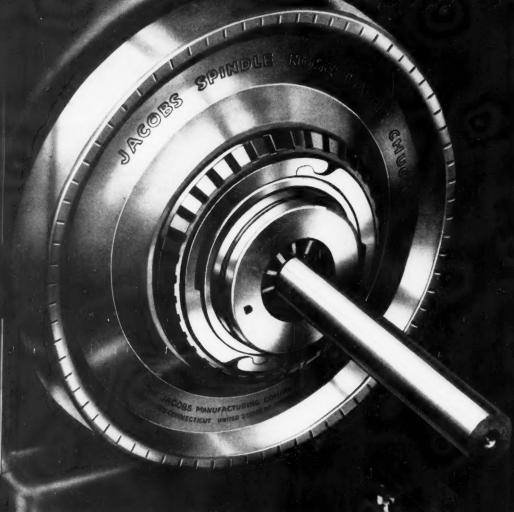
The Brown & Sharpe name is industry's guarantee that the traditional precision of these Johansson products will be maintained without compromise. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

BROWN & SHARPE



Now.



The new Jacobs Spindle Nose Lathe Collet Chuck. Introduced at the Chicago Machine Tool Show, now further refined and extensively field tested and proudly presented to you through Jacobs Distributors.



The Jacobs SPINDLE NOSE LATHE CHUCK

THE JACOBS MANUFACTURING COMPANY • West Hartford 10, Connecticut

If it's a JACOBS . . . it holds!

Sacobs brings you the most amazing Lathe Collet Chuck in machine tool history!

NO OTHER LATHE COLLET CHUCK CAN GIVE YOU ALL THESE ADVANTAGES:



SUPER ACCURACY . .

Precision built to deliver accuracy never before obtainable in collet equipment. The most accurate collet chuck in the world today.



TREMENDOUS GRIP ...

Gives two to four times the gripping power of split steel collets. You can now use the maximum speeds and feeds of the most modern tool room lathes — safely.



AMAZING COLLET RANGE... Each collet has a full ½" gripping range. Elev-

gripping range, Eteren Jacobs Rubber-Flex Collets will chuck any bar between \(\frac{1}{6}''' \) and \(\frac{1}{3}\s'''\) \(\therefore\) one collet does the work of eight.



EXTRA DURABILITY .

The handwheel is solid aluminum and the forged alloy steel body is hardened and ground. All other parts of the chuck are of alloy steel, hardened and ground throughout.



NO FATIGUE... A unique impact mechanism allows rigid tightening and easy

tightening and easy opening of the chuck with a flick of the wrist.



UNEQUALLED ECON-OMY... You buy a chuck that will perform a COMPLETE

job of chucking — you save both on original investment and maintenance.



DEVELOPED BY JACOBS

... This new Spindle Nose Lathe Chuck is a product of Jacobs' development engineers. The Jacobs Manufacturing Company is the world's foremost producer of drill and tap chucks.

SEE YOUR JACOBS DISTRIBUTOR—A special eight-page illustrated bulletin is available from your Jacobs Distributor.



New edition of Catalog 899—just off the press—latest additions to CP line of UNIVERSAL ELECTRIC TOOLS—designed and built for the production line—and low maintenance.

Illustrated and presented in a new format for quick reference—is the complete line of CP Universal Electric Tools and accessories.

Write for a copy of Catalog 899-5



PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Announces a New, Low-Priced

POWER SHEAR FOR LIGHT SHEET METAL

• Here is the new high speed Power Shear that sheet metal men have been waiting for. New advanced engineering ...new styling ...new, easy, fast operation.

THE GREATEST DOLLAR for DOLLAR SHEAR VALUE YOUR MONEY CAN BUY

 This new Niagara high speed Power Shear is designed for light sheet metal work. One look at its distinctive styling indicates its modern performance.

Fabricated from unbreakable steel plate, it is engineered to combine strength and stiffness for accurate cutting.

Clear visibility of cutting line through cut-outs and over the top of holddown facilitates shearing to an accurate layout line.

Niagara Alloy Tool Steel Knives heat treated to a high degree of hardness and toughness and precision ground for accuracy provide keen cutting edges for longer service between grinds.

Quick Acting Back Gauge and convenient front and side gauges.

Capacity 20 gauge.

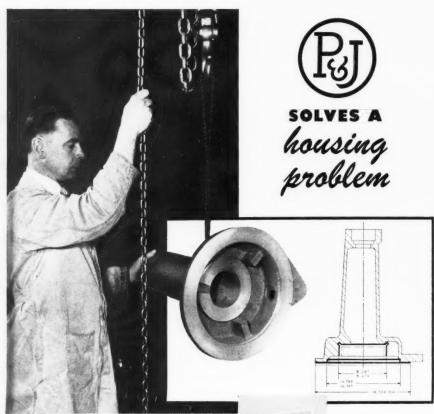
30, 36 and 42 inch cutting lengths.

125 cuts per minute.

Write for complete information and low prices

See how the new PANCAKE MOTOR DRIVE provides the most sompact construction ever ob-

NIAGARA MACHINE & TOOL WORKS . BUFFALO 11, NEW YORK



REAR axle housing, that is. Note the size...the 45° angular recess...the number of operations (12) for rough and precision-finish boring, spading, chamfering, facing...

This class of work is a natural for the P&J Automatic; with this Machine tooled the P&J way, you have a most efficient setup for today's high-speed, close-tolerance requirements. When next you figure on the precision-production of quantity duplicate parts, give consideration to P&J's specialized knowhow—and the profitable combination of P&J Tooling on P&J Automatics.

The P&J Tooling, to produce the work illustrated, was set up on the ODRELX, one of the OD series OF B&J Automatics described in this Bulletin. Write for your copy. If may also pay to get a P&J estimate on your prints or sample parts. Either way, there's no obligation.



Pawtucket, R. I.
subsidiary of Pratt & Whitney
Division Niles-Bement-Pond Company



PRODUCTION TOOLING
HEADQUARTERS

Enthusiastic Customers do our BEST advertising

Standard Pressed Steel Co., Jenkintown, Pa., use No. 25 Grand Rapids Hydraulic Feed Surface Grinders in making the tools and dies that produce Unbrako Socket Screw Products, Flexloc Self-Locking Nuts and Hallowell Shop Equipment.



You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

- 1. One-piece column and base casting for vibrationless rigidity
- 2. Precision ball-bearing spindle which is greased for life
- Bijur one-shot lubrication system eliminating hand oiling
- 4. Patented vertical movement of wheel head for quick, accurate adjustments
- 5. Portable coolant tank for ease of coolant replacement
- 6. Vane type hydraulic pump for fast longitudinal table travel

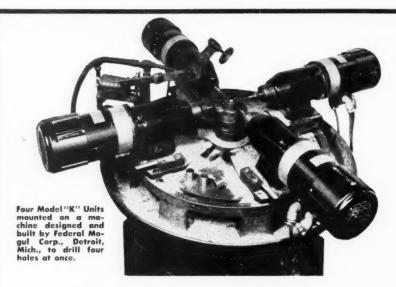
To some you -

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.



GRAND RAPIDS GRINDERS

308 Straight, S. W., Grand Rapids 4, Mich.



How to Reduce Labor Costs!

U SERS of Govro-Nelson Automatic Drilling Units are our authority for the somewhat startling statement that multiple drilling with our units has usually resulted in stepping up the production rate from 4 to 10 times, with a corresponding decrease in labor costs.

For example, on one Govro-Nelson installation, the present output of one operator is greater than the former output of three.

Send for literature showing the possibilities of Govro-Nelson Units from the standpoint of reducing labor costs.



GOVRO-NELSON CO.

Machinists of Precision Parts for 25 Years 1933 Antoinette, Detroit 8, Mich.

Automatic DRILLING UNIT



INSIST ON BATH TAPS . . . PROFIT BY THEIR PLUS-PERFORMANCE

Bath ground thread taps are made from the highest quality steel. Ground from the solid after hardening, these modern cutting tools are of uniform structure and consistent accuracy.

The uniform hardness of the cutting edge of Bath taps increases tap life and lengthens tap service between grinds.

Bath taps are made in many styles for threading all kinds of materials. Available in standard stock sizes or custom built for special jobs. Let Bath representatives help with your unusual threading problems...or write us direct!

PLUG AND RING THREAD GAGES . GROUND THREAD TAPS . INTERNAL MICROMETERS



Fastest way to Low Cost Taps.... A Blake Tap Grinder

Send today for Bulletin 549S with Full Information on this time-saving, money-saving machine



437 Cherry Street, West Newton 65, Mass.

Black Diamond Precision Drill Grinders . . . Blake Tap Grinders . . . Blake Flute Grinders . . . Waltham Cutter Sharpeners . . . Waltham Thread Milling Machines . . . American Tool Holders . . . Surface Finish Standards.

Cast Iron machining dust giving you trouble?

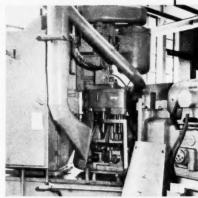
IF SO YOU'VE GOT A JOB FOR ROTO-CLONE DUST CONTROL

CAST iron dust has long presented a collection problem. Now, with increased machine tool speeds and the tendency to concentrate a greater number of operations in a given area, there is an everincreasing demand for a practical solution.

And here's the answer. Scores of companies are using Type D Roto-Clones* successfully to exhaust and collect fine, floating cast iron dust from their machining operations. Whether it's drilling, reaming, boring, milling, turning or gear cutting, you are assured of positive dust control.

The Type D Roto-Clone is the most widely used dust collector in industry today. Its advantages are many—constant efficiency under all operating conditions, uniform air volume, small space requirements and ease of installation. When desired, a Cycoil Oil Bath After-Cleaner can be added which will provide the necessary cleanliness to permit recirculation of the cleaned air to the workroom.

For complete information on the application of the Type D Roto-Clone to cast iron machining operations, call your local AAF representative or write direct to—



Roto-Clone Dust Control applied to Rebnberg-Jacobson Automatic which mills, drills, counterbores and reams.



Ex-Cello Boring Machine equipped with Roto-

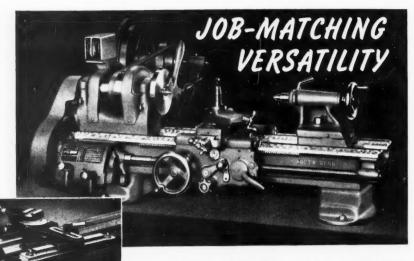
AMERICAN AIR FILTER COMPANY, INC.

100 Central Avenue, Louisville 8, Ky.

In Canada: Darling Bros., Ltd., Montreal, P.Q.

*Roto-Clone is the trademark (Reg. U. S. Pat. Off., Jofthe American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and bydrostatic precipitator types.

ROTO-CLONE®



TAPER ATTACHMENT



HANDLEVER BED TURRET



SQUARE TURRET TOOL BLOCK



MILLING ATTACHMENT

SOUTH BEND 9" LATHE

Here's a lathe that cuts machining costs on small precision parts. Its wide ranges of speeds, power feeds and threading feeds provide versatility for practically every job. Numerous job-simplifying attachments make the scope of its work even greater. This enables you to better match the lathe to your jobs. It results in faster operations, greater accuracy, quicker set-ups and the release of heavier machines for heavier work.

Write for catalog or call our distributor listed under "Machine Tools" in your classified telephone book.

ILLUSTRATED ABOVE:

9" x 3' Model A 12-Speed Bench Lathe with 3 phase, 220 V. motor and switch, f.o.b. factory

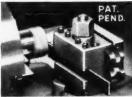
SOUTH BEND LATHE WORKS



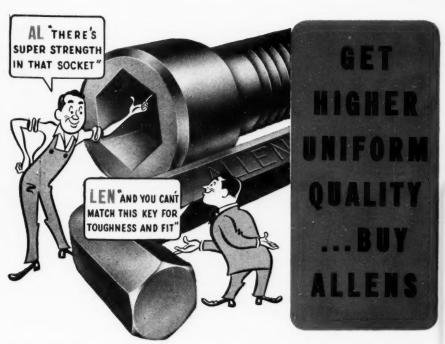
Building Better Tools Since 1906
427 E. MADISON STREET, SOUTH BEND 22, INDIANA



EXTERNAL GRINDER



UNIVERSAL TOOL BLOCK



Allen quality starts with the use of Allenoy steel, developed specially for the purpose. The strength of the steel is preserved and reinforced at vital points leaving the steel fibres uncut and intact. Not only is threading to class 3 fit held to extreme accuracy, but extra operations assure maximum grip. Heat treatment is regulated to laboratory standards of precision.

Quality control is assured by laboratory testing of every batch in addition to the most careful gauging and inspection at the machine. These are some of the reasons for the higher uniform standards of Allen screws. Write us direct for descriptive folders or technical information.

HAVE YOU TRIED ...

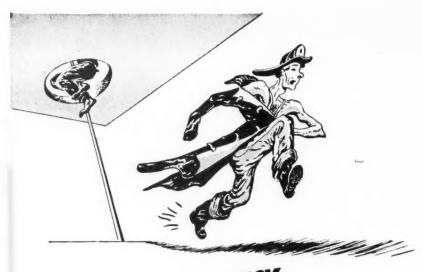


ALLEN HEX SOCKET FLAT HEAD CAP SCREWS

Allenoy steel plus positive wrenching makes them vastly superior to ordinary cap screws.







WHEN WE SAY QUICK

FOR QUICK PIERCING OF SHEET METAL USE A WIEDEMANN

Here's a typical example of how piercing time was reduced 90% by using a Wiedemann Turret Punch Press.

THE JOB: An order of 10 pieces 12% x 8% x .078 mild steel (50 openings pierced requiring 7 different shapes and diameters)

TOTAL TIME FOR 10 PIECES:

OLD METHOD: 9 hours, 16 minutes WIEDEMANN METHOD: 1 hour, 16 minutes (Time includes loading and unloading material in the machine)

TIME FOR 1st PIECE . . . 19 minutes, 18 seconds

TIME FOR EACH OF NEXT 9 PIECES . . 6 minutes, 39 seconds

The job was produced on a Wiedemann R-4P 11 Station Turret Punch Press with Drop-latch gauge. Layout work was done directly in the machine and is included in the above time.

You can see for yourself . . . when we say QUICK we mean QUICK. See a Wiedemann Turret Punch Press in operation. Write us for address of a shop in your vicinity that uses a Wiedemann for short run piercing at long run low cost . . . and send for descriptive literature on presses which fit your needs.





WIEDEMANN MACHINE COMPANY 4219 Wissahickon Ave., Philadelphia 32, Pa

WIEDEMANN TURRET PUNCH PRESSES & CANCEL

WHICH ONE? NAME YOUR SPINDLE



t and

8" dis. wheel; housing dis. 314", over-all length 155g", max. speed 6000 RFM.



P-327

Direct Motorized Cartridge Type Grinder Spindle.



P-2500

from 2, to 20 HP. Ask for Calalog 58.



Internal Grinding Spindle for every requirement. Ask for new Catalog 57.



P-274

New belt driven Spindle for No. 2 Cincinnati Cutter Grander,



Heavy Duty Wheel Heed Spindle; over-all length 25%, "center height 3", foot type housing 15% long x 5%," wide; mex. speed 4000 RPM.



P-693

High cycle, 16,600 RPM, totally enclosed fan cooled 1 HP motorized spindle, over-all length 185 ",", berrel dia 3".



P-5793

3, 5 or 10 HP, heavy duty deep hole grinding Spindle; 1800 or 3600 RPM; barrel dia and length to specifications.

ROPE

builds into these Spindles the precision performance and long life that results in better work and more of it. Get the facts and figures on the one best Spindle for your job.



P.53

Boring Machine Spindle for Diamond or Carbide Tools, over-all length 20", center height 3", base 1444" x 8", max. speed 5000 RPM.

SPECIAL SPINDLES

Send us your specifications for a quotation.

Check and Mail This Pope Machinery Corporation 261 River St., Haverhill, Mass.

Gentlemen

Please send descriptive literature, specifications and estimates on the Pope Spindle types checked P-1 P-32T. P-2500 ...
INTERNAL P-274 P-666 P-693 P-531 P-5793 ...
Special Spindles for ...

NAME.

POSITION. COMPANY No. 62



on Rotary Sanders

Because the abrasive is *molded* throughout the disc, the MolDisc maintains its maximum abrasiveness for days instead of minutes. Savings in dollars are assured on most metal finishing operations. Hours are saved in mounting time, as a single MolDisc outlasts 25 to 30

Order a trial lot now and profit by these savings

Specifications range from harder, stiffer bonds for roughing and fast metal removal to more flexible or resilient bonds for finishing. Standard size, 7" x ¼" x ¾". Recommended for speeds to 6,000 RPM. Mounting flange and nut furnished on request.

ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION - PASSAIC, NEW JERSEY



coated discs.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls



20" Sebastian Lathe with 10' bed, roughing out teeth for involute spline broach at Conant Tool & Engineering Co., Chicago, Illinois.

Conant Tool & Engineering Company is decidedly enthusiastic about its recently installed "Kingmade" Sebastian Lathe. Mr. E. D. Conant, President, writes: "We have been roughing out large round broaches made of 18-4-1 high speed steel . . . adaptor plates and broach horns up to 16" diameter . . . doing a considerable amount of thread cutting, and find the machine very satisfactory in every re-

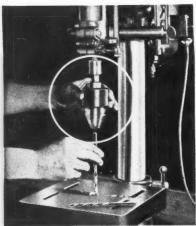
spect... We have realized about a 25% saving in time and we would have no hesitancy about purchasing additional Sebastian Lathes." You will buy performance like this when you specify the modern precision engineered Sebastian—outstanding leader in the mediumprice lathe field. Write now for illustrated Catalog S-1 (Standard Lathes) and S-101 (Special Type Lathes—Gap, Clutch & Brake, etc.)

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO

Builders of King Vertical Boring & Turning Machines and Sebastian Lathes

Change drills in a second, safely with this Automatic Chuck while spindle is running



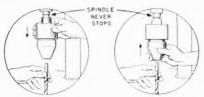
AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wandstrom Chucks are available in several size ranges. Model A=1/32 to 1/2 : Model AA=1/64 to 3/8 : Model B=15/64 to 1/2 : 3/8 to 3/4 : 17/32 to 1 : Model C=Holds any size tool with No. 1, 2, or 3 M. T. Shank.

HERE'S ALL THERE IS TO CHANGING DRILLS



Grip sleeve-pull down
-jaws open automatically
-drill is released.

Insert new drill-push up tapered part-drill is locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. One spindle does the work of several.

Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools... Model A-1/32" to 1/2; Model AA-1/64" to 3/8"

See your local distributor or write today for Bulletin 56-1.

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

WAHLSTROM fully automatic

DRILL CHUCKS





Size—shape—quantity; you can't stump the Monarch "Air-Gage Tracer" on any of these.

Here's why it's tops among tracercontrolled lathes when it comes to versatility.

The "Air-Gage Tracer" is:

- 1—Applicable to all sizes of Monarch Lathes, from the 10" to the 32".
- 2—Able to employ either a flat or a round template.
- 3—Adaptable for use on any length machine. The Type C (illustrated above) is recom-

mended particularly for extra long work.

- 4—Equally proficient for contour turning, boring and facing and for multiple diameter work, including step shafts.
- 5—Available in conjunction with variable feed and rapid traverse return as a Packaged Unit, which provides a completely automatic cycle as a further boost to production.

May we show you how this faster, better method of tracer-controlled machining fits into your profit picture?

The MONARCH MACHINE TOOL Company . Sidney, Ohio





FOR A GOOD TURN FASTER - TURN TO MONARCH



but only one standard of precision

• For research, supervision or control—in laboratory, toolroom or production line—tests made by the "ROCKWELL" Superficial are as representative of hardness as those made on the regular "ROCKWELL" Hardness Tester. Only requirement is that, since depth of indentation is only .005" or less, surfaces must be smooth and materials homogeneous for general testing.

This instrument is especially suitable for testing very thin material, nitrided or lightly carburized steel and areas too small for regular "ROCKWELL" Hardness Tests. A Wilson Field Service Engineer will be glad to discuss with you whether or not a "ROCKWELL" Superficial Hardness Tester will best serve your needs.



Brale is the only diamond indenter made to Wilson's precision standards for use on "ROCK-WELL" Hardness Testers and "ROCKWELL" Superficial Hardness Testers.

WILSON

MECHANICAL INSTRUMENT CO., INC.



230-G PARK AVENUE, NEW YORK 17, N. Y.

Operators acclaim it as



1		1	(
	IDLE SPEE	DS 🖘 🔾	
4.4	VER POSITION	TAST	
15 CF	18 75	89	
65	325	380	1
24	1	34	3
105 445	35	615	
2 40	47	55	
170	200 850	235 1000	
725	28	,41	
CENTRAL	122 525	POSITION	

Whenever operators enthusiastically claim a feature as a morey maker their it automatically fellows that

The direct reading speed control of "AMERICAN" Pacernaker Lathes I real money maker and operators from admit it. It makes their work eas of they can secure the right speed quickly they produce more work because of and, what is of paremount important the pay roll deliar buys more as a consequence.

The direct reading speed control unit shows at a giance the available spell and the simple means of securing the nit imagine 27 spindle speeds being securithrough only two conveniently placed direct reading levers without having prefer to index plates or having to retain lever positions in mind.

Furthermore, the simplicity of a mechanism and the infinitesimal till required to make speed changes inspector confidence and encourage in to make changes necessary to see correct cutting speeds.

This and other fine features of the "AMERICAN" Pacemaker are thoroughly illustrated and described by Bullet No. 16.



THE AMERICAN TOOL WORKS CO., Cincinnati, Ohio, U.S.A. LATHES AND RADIAL DRILLS

"Preference-Proof"

NORMA-HOFFMANN PRECISION BEARINGS

Provide Smooth Operation and Give Long-Life in

BLACK AND DECKER PORTABLE TOOLS

SINCE 1918 Black & Decker Engineers have been using Norma-Hoffmann Precision Bearings in many of their portable tools for their exceptional longlived, dependable performance.

A typical application example is the "B & D" 12" Standard Drill, illustrated, in which three Norma-Hoffmann Bearings are used. Commutator and fan end of the armature rotate on single felt seal shielded bearings...and the chuck spindle is carried on a double felt sealed bearing. Armature speed is 16,800 RPM . . . full load spindle speed is 275 RPM.

Manufacturers of other equipment from electric motors to machine tools, can also benefit with the use of Norma-Hoffmann Precision Ball and Roller Bearings. Their dependability, friction-free smoothness and quietness of operation improve design and performance of products wherever they are used. A wide range of types and sizes makes selection easy.

Norma-Hoffmann Field Engineers will gladly help you with your bearing problems. Write for their assistance

NORMA-HOFFMANN BEARINGS CORPORATION STAMFORD, CONNECTICUT

NORMA-HOFFMANN BEARINGS Recision

BALL . ROLLER . THRUST

Norma-Hoffmann Bearing equipped Black & Decker 1/3" Standard

Above — Single felt seal shielded ball

Left - Double felt seal ball bearing



JIG GRINDING

WHEN Jig Grinding is required you can have it quickly and economically with the Vulcanaire. Place in the spindle of your Jig Borer (or Mill).

AND YOU CAN . . locate—finish grind holes in hardened steel to "tenths" at controlled speeds up to 65,000 R.P.M. . . grind dowel holes—square with a ground base . . move location of holes in hardened steel blocks . . grind interchangeable holes in hardened sections . . grind .032 to ½" holes with diamond impregnated laps . . grind contours and relief with tungsten carbide burrs . . grind radii in die sections . . grind contours in gages . . jig grind large and awkwardly shaped components . . eliminate jig bushings in tools where close spacing is essential.

RESULTS! Jig ground requirements are being designed into tools by the most enlightened engineering departments. Jig ground the hardened die, stripper plate, and die holder all fit together. uniform clearance means longer runs.

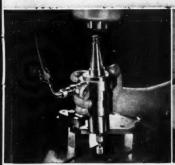
ADVANTAGES! the investment is less than for many Jig Boring accessories such as a rotary table . . the Vulcanaire can be put on and taken from the machine in a few seconds . . the Vulcanaire is completely portable (all accessories are platform mounted) . . the system can be used between several machines of various capacities , . employing both

the 10,000 and 20,000 series, components with various sized holes from the very smallest to 4" in diameter can be Jig Ground . . the average Jig Borer operator becomes proficient at Jig Grinding after very little experience.

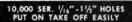
TOPS IN PRECISION . . the Vulcanaire is precision built throughout and is constructed of alloy and tool steel. Super precision bearings, preloaded with our special fixtures are used, with all traces of radial and end clearances removed, resulting in Vulcanaire lig Grinding to "tenths" . . for quotation and literature please mention machine tool application.

VULCAN TOOL CO.

731 Lorain St. Dayton 10, O.







20,000 SER. 11/2" - 4" HOLES ADAPTORS INTERCHANGEABLE



FOR JIG BORERS OR MILLS

Management ...

Juggle these figures!

then check Anding

The versatility, accuracy and high speed of Bodine dial feed automatics has been so well demonstrated that many plants requiring repetitive production of small parts are replacing single purpose machines with these multiple spindle automatics.

There are 6 standard types in the Bodine line, each of which may be tooled in a great variety of arrangements. One combination might be for Milling, Drilling, Tapping and Screw Inserting... with as many as 8 spindles located for vertical, horizontal, diagonal or inverted operation... around an indexing horizontal dial. Hopper or manual feed, automatic or manual eject.

If your production comes within Bodine capacities, you can't afford to overlook investigation.

Send for catalog.

CUSTOMER ORDERED

A battery of 16 Bodine automatics of various sizes to process millions of small components . . . continuously.

AVERAGE COST OF MACHINES

Approximately \$10,625 each . . range \$3,500 - \$14,000.

PRODUCTION COST SAVINGS

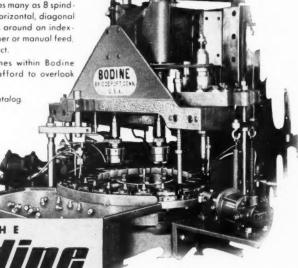
Careful check of cost sheets shows savings far beyond original estimates.

INVESTMENT PAYS OFF FORT

This is not an unusual case . . . many like it Shows tremendous possibilities of Bodine automatics. Machines will frequently pay for themselves in less than 6 months. Your investment in Bodine machines will yield continuous dividends!

HOW ABOUT DEPRECIATION ON MACHINES?

Will vary . . . but figure it out yourself. It's a good buy.



"You can't meet tomorrow's competition with Yesterday's Machine Tools"

AUTOMATIC DIAL TYPE DRILLING, MILLING, TAPPING, AND SCREW INSERTING MACHINES

AXELSON FIRST CHOICE

SHOP SUPERINTENDENTS AGREE that machinists produce more work of higher quality with fewer rejects on AXELSON lathes because of their infinite ease of operation, greater versatility, and built-in precision.

MASTERPIECE OF PERFECTION

MORE PRODUCTION PER MAN-HOUR results when a job goes on an AXELSON lathe...machinists actually like to operate them...location of controls minimizes lost motion.

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Authorized Distributors In All Principal Industrial Sections



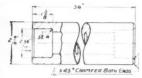
40 CHAMFER BOTHENDS CENTER DRILL BOTH ENDS

(9) Chamfers O.D. and reams

both ends of tubing

Operation: Cut off, chamfer and center drill both ends. Material: SAE 1040 ground shafting.

Production: 240 pcs/hr



Operation: Cut off, bore and chamfer inside and outside, both ends SAE 1020 tubing. Material Production: 180 pcs/hr.

6 × 45*

long, profitable life.

Operation: Cut off, chamfer one end. point opposite end. D SAE 1141 C. R. Material: Production 163 pcs/hr



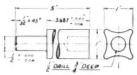
equalizing, self-centering jaws for accurate double-end

machining. You save at least one operator; save several handlings; save overhead and floor space; save tooling

Husky construction makes for trouble-free service and

Illustrated below are six typical "transfer" jobs.

Operation Cut off and chamier both ends Material 1020 seamless tubing Production 342 pcs/hi



Cut off, turn one end, drill Operation: opposite end Material Extruded brass Production: 200 pcs/hr

38.3 2 005 WITHIN DOZTIA CENTER DAILL BOTH ENDS

Cut off, box mill, turn and Operation center drill both ends Material **SAE 1020** Production: 140 pcs/hr

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Gage. Model 1000 is "IT", the right gage at the right price. There are no tricky gadgets — Model 1000 is simple, easy to set and easy to use. It's rugged and fully guarded to withstand the roughest handling. It feels and handles like an old fashioned conventional gage but it's years ahead in design and performance. Model 1000 is completely new and up-todate in every detail . . . newer even than any other Indicating

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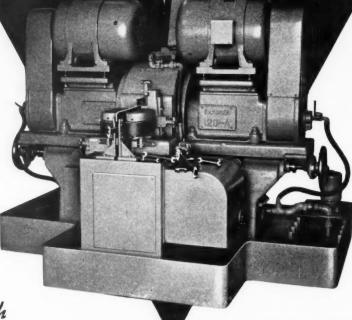
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428 East Gardner Street * * * * Beloit, Wisconsin, U.S.A.

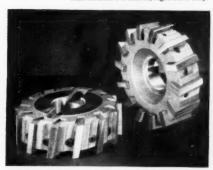


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Send jobspecifications and we will supply full details without obligation.

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It's designed to provide industry with low-cost, high production units that are highly flexible in design and operation . . . relieving heavier presses of short runs and lighter work. Presses are practically fool-proof in operation. Frame is extremely rugged. Fingertip controls are conveniently located at hand level. Available for immediate delivery, in standard width (between uprights) of 24"-31"-36"respectively. Available in special width up to 72" at small additional cost. Movable bed plates. Pumping unit has bypass relief valve which can be set at any pressure up to press capacity. Presses available for either vertical or horizontal operation. All Standard presses equipped with 2-speed builtin hand pumps for more sensitive and versatile operation.

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CYLINDERS: Standard Models furnished with 6" bore, 7½" stroke – spring return type; also 5" bore, 7½" strokespring return type. Above presses are standard. Following can be furnished at additional cost: Double Acting, 6" bore, 7" stroke; 6" bore, 11" stroke; 5" bore, 7" stroke; 5" bore, 11" stroke. Special long stroke cylinders also available, up to 48" in length, for incorporation in suitable press frames of our make.

PUMPING UNITS: These units can be supplied in various volumes and pressures, in a total of 13 combinations

Presses include V blocks, Gauge, Motor Controls, Pressure Regulator, etc., complete and ready to attach to electrical source.

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Depending upon capacity of pumping equipment, prices of Standard model motor driven hydraulic presses are as follows, F. O. B. Factory: 25-ton press from \$727.00 to \$992.00. 50-ton press from \$806.00 to \$1058.00. 60-ton press from \$1070.50 to \$1135.00. 75-ton press from \$1198.00 to \$1258.00. All motors in the above units are 220/440 volt, 3 phase, 60 cycle. Any change in motor specifications is extra. *Subject to change without notice.

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It will bring you all the money-saving facts about these low cost, high production hydraulic presses. Now is the time to get ready for the highly competitive days ahead

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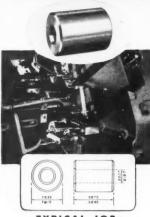
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TYPICAL JOB:

The above part for an International Diesel Engine Injection Pump is produced on a 1" Greenlee "6". The part, a nozzle valve guide, is completed as shown with a tolerance of .002" on the hole diameter. A later operation grinds the hole to .0005" tolerance. An accelerated reaming attachment is used as shown in the 6th or cutting position for the finishing operation of the center hole. The accelerated action of the attachment permits its use on the Greenlee in four positions, including cut-off.

SIX-SPINDLE AUTOMATICS

CONTROL SYSTEM SAVES TIME FOR FOREMAN

A system of quality control and a little teamwork between the inspection and screw machine departments of International Harvester Co., Milwaukee, has elevated production standards and lowered scrap losses in the manufacture of parts for Diesel Engine Injection Pumps.

In the screw machine department pictured above, where four Greenlee 6-Spindle Automatics are at work, the inspector makes an hourly spot-check of parts produced by each machine. It is an important part of a quality control system which aids operators, helps maintain standards, and at the same time allows the foreman more time to handle set-up, tooling, and scheduling problems. Fitting into this production plan, Greenlee Automatics are called upon to produce parts with a good degree of accuracy and handle both short and long run jobs economically.





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Bulletin B-1139-6

Solid tungsten carbide boring tools
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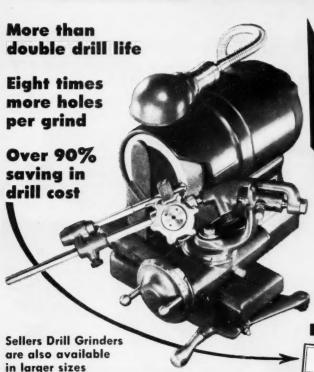
Bulletin B-AB-1



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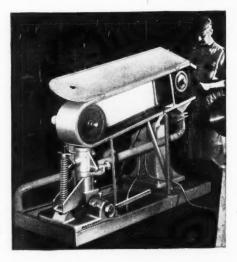
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PIECE	LENGTH	DIAMETER	STOCK REMOVED	TIME
Hardened Pump Liner	27"	7.250"+.0005"	.015"—.018"	10 min.
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Chrome Plated Diesel Liner	32"	8.500"±.0005"	.004"—.006" of chrome	3 min.

(Above) Fulmer Model 10-25, honing 5 ¾ bore aircräft cylinder, removing .006 of stock. Rate: 24 cyl. per hour.

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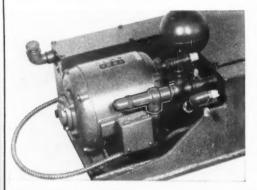




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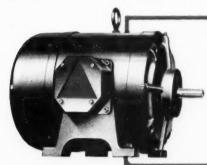
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pays for itself . . . quickly



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Length of time required to polish dies with this machine can be computed in seconds or minutes. Endless abrasive belt is driven at 5,000 lineal feet per minute. Compare the speed of this motorized machine with time-consuming hand lapping or other polishing methods!

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The inner surface of the die need not be materially reduced. Dies can be held to size and repolished more often without reworking. Operation of the machine is so easy that dies can be polished quickly before any grooving or pitting appears. Accommodates almost any style of die, such as dies used in drawing rods, bars and tubing, as well as deep drawing dies.

finer finish



This abrasive belt method polishes dies parallel with the line of draw of work through the die. A finer mirror-like finish is imparted to the die which results in a better and finer finish to the work. Machine is adjustable to prevent bell mouthing of the discharge side of the die if necessary.

cuts cost



Since the Hartford Special Die Polishing Machine cuts polishing time to a fraction of former methods, increases the number of times dies can be repolished without reworking and increases the overall efficiency of the dies, its economy is apparent. Write now for full details on this modern method of die polishing.

THE HARTFORD SPECIAL MACHINERY CO. 287 Homestead Ave., Hertford 5, Conn.

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ARMSTRONG

TOOL HOLDERS . . . for every operation!

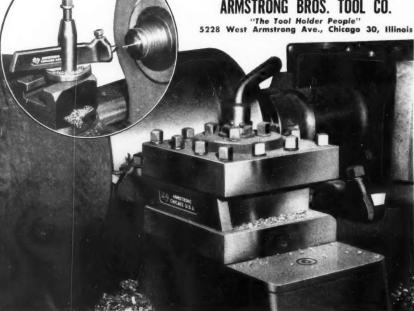
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With Standard shaped cutters, bits and blades of ARMSTRONG HIGH SPEED, ARMALOY (Cast Alloy) and ARMIDE (Carbide-Tipped) they provide a system of tooling that assures maximum production per machine hour, lower tool costs, and higher machining profits.

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Write for our new 5-48 Catalog.

ARMSTRONG BROS. TOOL CO.



Machine Shop

SEPTEMBER, 1949

Vol. 22, No. 4

Features in this Issue

Building Metering Pumps

By Fred W. Vogel

A tour through the W. H. Nichols plant reveals many interesting operations involved in the manufacture of gear-driven metering pumps. Descriptions of some of the outstanding machining operations form the basis of this unusual story. Page 98.

Carbide Tooling at New York Naval Shipyard

By J. G. Kenney

The program for coordinated carbide control described in this article enabled the New York Naval Shipyard to speed up production as much as 400 per cent on some types of work. Page 110.

An Analysis of Blanking Die Designs, Part VI

By C. W. Hinman

Mr. Hinman devotes this article to a description of tandem and follow dies that are designed for perforating and blanking operations. Page 126.

Practical Pointers on Steel Treating, Part IX

By W. R. Benne

In concluding his present series of articles, Mr. Bennett discusses pack hardening of high-speed steel, long draw, high carbon-high chrome steel, pack hardening high carbon-high chrome steel, hardening splined shafts, and the selection of steel for the job. Page 138.

New Machine Shop at Gulf Research Laboratories

This machine shop provides the metal-working facilities required by Gulf Research Laboratories' staff of chemists, physicists, and engineers. The parts required for geophysical prospecting equipment made by Gulf and used in its exploration activities throughout the world are manufactured here. Page 160.

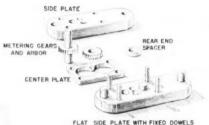
Sales Hints for the Smaller Shop, Part II

By Karl F. Kirchhofer

Mr. Kirchhofer offers some practical suggestions to the small manufacturer who is faced with the problem of distribution. Advice on preparation of publicity material is also given in this article. Page 182.

Finding A Future in Fisher Body

This article describes the Fisher Body Division apprentice training program—a program which offers the 18-to-21-year-old beginner in industry unexcelled opportunities for a career in automobile body building. Page 188.



FLAT SIDE PLATE WITH FIXED DOWELS AND METERING GEAR STUD, AND BINDER SCREWS

Building Metering Pumps

In this article the author describes the special operations that enable W. H. Nichols Company to produce the most accurate assembly of commercial parts—the rayon metering pump.

By FRED W. VOGEL

WITH the discovery by the Comte de Chardonnet more than half a century ago that gun cotton treated with a mixture of alcohol and ether formed a solution which, after being properly aged and filtered to obtain a pulp residue or viscose of a consistency that could be forced through very fine holes to produce threads that could be woven into fabric, a new synthetic

product—rayon—was born. Because of its close resemblance to silk, this new product received immediate wide-spread attention. Plants for the manufacture of rayon materials were built in several foreign countries as well as here in the United States and, as in the development work of every new product, a considerable amount of effort was expended in improving the

process and particularly in increasing production to meet the demand that had been created.

One of the early production problems involved the use of a pump for forcing the liquid viscose through

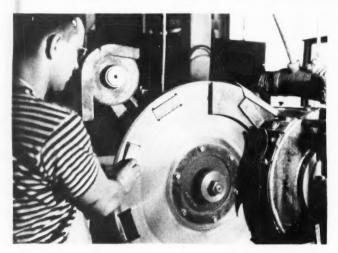


Fig. 1—View of operator placing side plates on feed wheel of Besly surface grinder.

tiny orifices that form it into threads. The required pump had to be built to deliver the viscose at a constant pressure in order to assure the production of threads of unvarying size. When it is realized that a separate pump is required to produce each thread, the magnitude of the job of mass produc-

thousandths of an inch, but to "quarter-tenths." The following article describes a number of the more interesting operations that are performed at W. H. Nichols Company in the manufacture of the rayon metering pump.

The standard metering pump consists of two stainless steel 5%-inch side

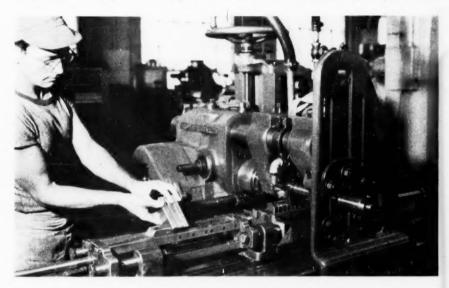


Fig. 2—The ends of the side plates are milled in the Brown & Sharpe No. 12 milling machine shown here.

ing an accurate pump can be imagined.

After a considerable amount of experimenting, it was found that a pump of the gear driven type was best suited for the job. In the operation of the gear type pump, each space between the teeth of the gears serves the same purpose as a bucket on a water wheel. The liquid is carried from an intake port in each tooth space around two revolving gears, and squeezed out as the teeth mesh again over a discharge port. Pumps of this type for handling liquid viscose require precision machining operations in which vital dimensions are held, not just to ten-

plates and a ¼-inch stainless steel center plate. Running in the center plate are two hardened, ground tooth gears approximately one inch in diameter mounted on suitable shafts. One shaft has a tongue and is driven through a flexible connection by a gear outside. This gear meshes with a gear on a drive shaft of the rayon thread machine, the shaft being used to drive any number of pumps at from 20 to 30 r.p.m.

First in a series of precision machining operations consists of simultaneously grinding the flat sides of the metering pump side plates on the Besly grinder shown in Fig. 1. This grind-

er is provided with a 32-inch combination work-holding and "feed" wheel. Located near the periphery of the wheel are 9 equally spaced rectangular shaped openings into which the operator places the side plates to be ground. The wheel, operating at a speed of 1½ r.p.m., feeds the plates between two 23-inch grinding wheels which operate at a speed of 955 r.p.m. Approximately 0.010 inch stock is re-

the loading-unloading station. During a 9-hour period of operation of this grinder, approximately 2,100 pieces are ground.

After the grinding operation, the next step is to cut a radius on each end, an operation which not only cuts the desired curvature but also establishes the required length of the plate. The Brown and Sharpe No. 12 milling machine shown in Fig. 2 is used for the

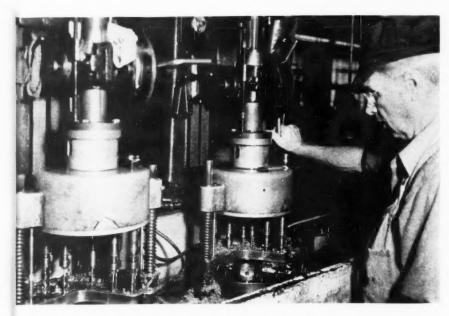


Fig. 3—Illustration showing drilling and tapping setup.

moved from each side of the plate as it passes between the wheels.

Due to the comparatively slow rotation of the work-holding wheel, the operator of this grinder is provided with a sufficient amount of time to remove a finished workpiece and reload another while the wheel continues to rotate. A stationary back-up plate which is located on the back side of the wheel prevents the plates from being pushed through the openings at

milling operation. This miller is equipped with a specially designed workholding fixture which basically consists of two separate vises mounted in tandem and rigidly fastened to the machine table in such a manner that none of the clamping strains are imparted to the table. Each vise consists of four bars which centralize the plates and absorb the clamping tension with end screws at each end to clamp them. The manner of holding

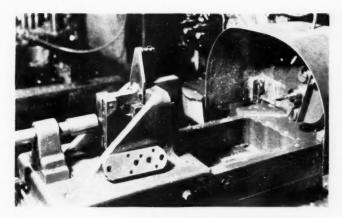


Fig. 4 — Four %-inch holes are bored in the side plates in the specially designed boring setup shown here.

the workpieces thus provided permits the machine to be operated continuously since a batch of the finished workpieces at one vise can be turned over for milling the opposite end, or they may be removed after the final pass beneath the cutter and a new batch loaded, at the same time that the workpieces in the other vise are being milled. Each holding vise is designed

to hold 12 pieces of %-inch thickness or 15 pieces of %-inch thickness.

Drilling follows, in jigs of special design, as shown in Fig. 3. These jigs are three-pronged in shape and are hardened all over, the holes for the drill bushings being kept soft by protective methods. After hardening, the bushing holes are finish bored with center distances being carefully maintained. For the drilling operation, three plates are mounted on a ro-

tating circular table with one plate being positioned underneath each prong of the fixture.

Drilling proceeds progressively as first

four holes are spotted, the rotary table indexed to the right for the drilling of four binder screw holes, and finally to the third position where four holes are reamed and later tapped. At the right in Fig. 3, in the same manner as just described, the mating sideplates are in turn drilled, reamed, and counterbored.

Accurate spacing of the four center-

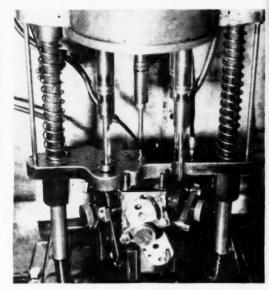


Fig. 5—A view of an ingenious drilling jig and holding fixture in which plates are accurately positioned for drilling viscose passages.



Fig. 6 — Spur gears are ground in the specially designed grinder shown here.

line holes is essential. Those at each end are for dowel pins and the two others are for the gear shafts. The close tolerances of the gear shaft centers and their location make necessary the single-point %-inch boring operation shown in Fig. 4. This boring machine utilizes the base and some of the mechanism of a Pratt and Whitney plain miller. With a side plate located in a simple work holder, it feeds automatically over the boring tool for boring one of the end holes and then withdraws. As soon as the workpiece is withdrawn, the table on which the boring head is mounted is automatically indexed the required distance for boring a gear shaft hole. Stops which are positioned on the bed of the table govern the distance of indexing. Movements of the workpiece and the boring head continue automatically until the other end hole has been bored, at which time the piece is removed and another replaced.

Figure 5 shows a view of an ingenious drilling jig and holding fixture that was devised for the purpose of accurately positioning the plates for drilling passages in the plates for the flow of viscose. The fixture takes care of the angles necessary to make smooth passages and avoid pockets which interfere with the free flow of

viscose, uniform flow being an all-important factor.

The flow passages are three inches in length and, in order to drill these passages as accurately and quickly as possible and without overheating the drill, they are step drilled an inch at a time in three separate drilling operations.

First, however, a hole is spot drilled and this is followed by the three step-drilling operation which completes the job. A ball bearing seat on the base of the fixture is a feature which enables the operator to quickly and easily manually index the work to the proper location beneath the jig for the drilling and counterboring operations.

Spur gears of the pump which meter the rayon solution to the spinerette at pressures up to 1,000 lb. per sq. in. are ground in the specially designed and built grinder shown in Fig. 6. The



Fig. 7—View of loaded shuttle in Heald centerless internal grinder.

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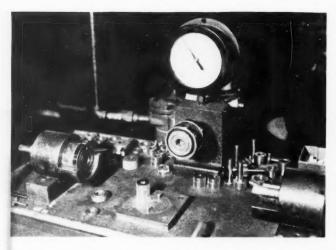


Fig. 8 — Checking ground holes by means of special air gage testing unit.

gear blanks are mounted on an arbor, eight in a group, from grinding the 26 teeth required in each gear. A $7\frac{3}{16}$ -inch wheel, operating at a speed of 3,600 r.p.m. is used to grind the teeth. The pitch diameter of the teeth is 0.9285 with an allowance of 0.0003-inch tolerance.

Grinding the 0.4062-inch shaft hole in the gears is a precision operation requiring a tolerance of 0.0002 inch. For this grinding operation, special shuttle-like fixtures, which were designed and built in the Nichols plant, are used for holding five gears at a

time. The loaded shuttles are placed in the Heald centerless internal grinder shown in Fig. 7. Production by means of this method averages 100 gears per hour.

After grinding, the holes are checked for

size in the special air gage testing unit shown in Fig. 8. In this illustration at the left may be seen the shuttle holding fixture loading device, consisting of a half shell on which the shuttle rests and a shaft which fits

through the shuttle and on which the gear blanks are slipped for proper location within the shuttle. After the shuttle has been loaded to its capacity, which for blanks of 0.196-inch thickness is five, a threaded cap screw with a hexagonal opening is screwed into the end of the shuttle to hold the blanks firmly in place. The fixture at the right in the same illustration, which very closely resembles the loading fixture in appearance, is used for holding the shuttle while removing the blanks from the shuttle.

Chamfering the edges of the center

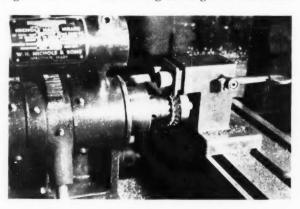


Fig. 9—Chamfering the edges of the center plate to remove burs. Operation performed on Nichols hand miller.

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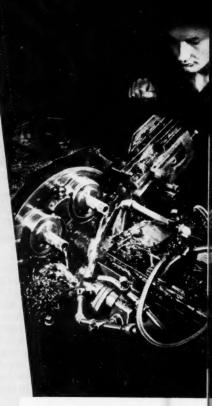
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Fig. 10—Lapping center plates in a Norton No. 2 flat lapper.

plate to remove burrs and also to produce a bevel is an interesting operation which is performed on one of the W. H. Nichols Company's own hand millers. A view of this operation may be seen in Fig. 9. As shown, the two gear openings in the center plate are fitted over two cylindrical projecting pins of the holding fixture. When these projecting pins are contracted together, the gear pockets in the side plate may be easily fitted over them. Then when the locking handle is pressed downward, the two pins spread against the sides of the gear pockets in the workpiece and thus hold it firmly in place. Mounted on the end of the shaft with the bevel cutting tool is a ball bearing collar which serves as a cam follower. In operation, this cam follower rides on and completely around the rectangular shaped projection of the work-holding fixture to guide the tool in the cutting of the bevel.

After the chamfering operation, the center plates are lapped in the Norton No. 2 flat lapper shown in Fig. 10 to obtain both the thickness parallelism and flatness required. The lapper is

equipped with cast-iron top and bottom laps. The work holders are circular in shape and are designed to accommodate four center plates each. Eight work holders with four plates each comprise a full load for the ma-

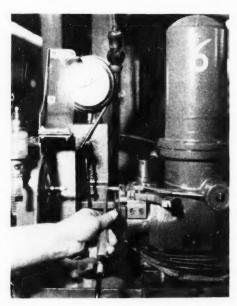
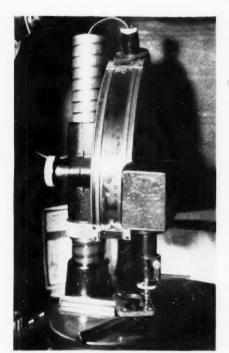


Fig. 11—Using a Pratt & Whitney plug type air gage to check diameter of ground side plate holes.



chine shown. Incidentally, the same size work holder is used for various sizes of workpieces, the differences in

Fig. 12—Testing flatness and parallelism of lapped center plate.

sizes being made up by the size of the spacer which is used between the workpieces. Best lapping results have been obtained with the use of Norton 400 size grit Alundum (B) abrasive grain used in conjunction with the U. S. Products Company Grade 303½ lapping compound.

A high standard of accuracy is maintained throughout all grinding operations. To check the size and concentricity of ground holes, for example, use is made of the best available types of checking and measuring equipment. As shown in Fig. 11, a Pratt and Whitney plug type air gage is used to check the diameter of ground side plate holes. A method for testing both flatness and parallelism in lapped center plates is shown in Fig. 12. The instrument used is a Zeiss Optotest equipped with a scale on which the observer may check variations in flatness to within .000025 inch.

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NOW THAT many old songs are being revived, we were not surprised to hear the following "oldie" whined the other day:

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"You can't get good help . . . "

But, you can get poor or mediocre help and train them to be good!

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And, by the same token, we've seen a bunch of meat-heads whipped into a smoothly functioning outfit in no time at all—by proper training.

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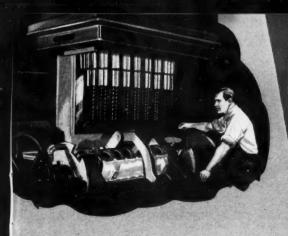
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Carbide Tooling at New York Naval Shipyard

A program for coordinated carbide control enabled the New York Naval Shipyard to speed up production as much as 400 per cent on some types of work.

By J. G. KENNEY
Carbide Coordinator, New York Naval Shipyard, Brooklyn, New York*

A T the New York Naval Shipyard, vessels of all types—ranging from the smallest landing craft to the largest aircraft carrier—are both built and repaired. In addition, many items are manufactured on a production basis and supplied to other Naval installations.

The three machine shops of the New York Naval Shipyard in which wide use is made of carbide tools are the Ordnance Machine Shop, the Inside Machine Shop, and the Central Tool Shop. In the Ordnance Machine Shop, responsibility is assumed for the manufacture and repair of all ordnance equipment including fire control instruments, radar equipment, and gun foundations. Upon the Inside Machine Shop falls the responsibility for the repair or alterations of all equipment removed from ships during their over-

haul period but not coming under the cognizance of the Ordnance Machine Shop. The Central Tool Shop functions as a service trade for other shops and activities in the Yard. The latter shop is responsible for the maintenance and care of all machine tools, loose and hand tools and mechanical equipment, and also for the manufacture of jigs, fixtures, and special tools which are not available commercially.

On the ground floor of the Ordnance Machine Shop are located machining facilities for handling all large, heavy ordnance equipment. Machine tools on other floors of this building include 300 lathes, 100 milling machines, 3 planers, 12 boring mills, and other miscellaneous machine tools. Work scheduling in this shop more closely approaches "production" than in the others.

In the Inside Machine Shop, many types of machine tools are located on 8 separate floors of several buildings. The machines include 800 lathes ranging from those 100 feet long and having a 36-inch swing to the smallest tool room lathe; 350 milling machines

^{*} The opinions or assertions contained herein are the private ones of the writer, J. G. Kenney, Carbide Engineer, and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at Large.

Fig. 1—The standard types of carbide tools shown here are used for many types of machine operations. Quantities of these standard tools a restocked in the Central Carbide Room and enough tools are drawn out by the Touch-Up Stations for each 24-hour period.

of all types; and planers, boring machines, and so on.

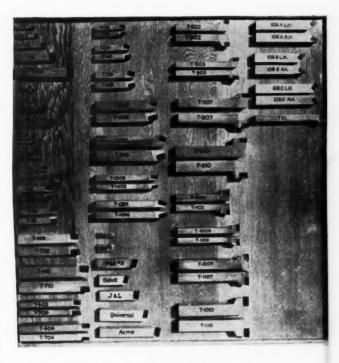
The Central
Tool Shop—
smallest of the
three shops—has
fewer machine
tools than the
other two. It is located centrally
with respect to
other shops in the
Yard. This shop
controls the man-

ufacture, grinding, and the issue of tools in the Central Carbide room.

Development of the Carbide Program

The first step in the carbide program was to send ten of our machinists to several large industrial plants for short training courses. These courses were given by Carboloy Company, Inc., Detroit, Michigan, in cooperation with the other plants. This training provided the men with a basic understanding of carbide usage and also gave the men an incentive to develop the uses of carbides at the shipyard. On their return, these men were stationed throughout the shops to instruct machine operators in applying carbide tools to all types of work.

Centrally located Touch-Up Stations were established throughout the Yard for the regrinding of tools. A



Central Carbide Tool Room was set up to service the Touch-Up Stations with tools, as well as to control stock and distribution. To coordinate the work of the Central Carbide Room and the Touch-Up Stations, a delivery system was installed for the transportation of tools between rooms. At the beginning of each shift, assigned messengers deliver the tools from the Central Room to the Touch-Up Stations, upon advisement of the Touch-Up Station supervisors.

Standard Tools Used

Despite the many and diversified types of machining operations at the shipyard, it has been found possible to specify a particular grade of carbide as a general purpose steel cutting grade, and another grade as a general purpose non-ferrous cutting grade.

These grades were so designated after testing representative carbide grades and selecting the grade most adaptable to shipyard work.

Shown in Fig. 1 are the standard styles of tools which are in use at the New York Naval Shipyard. These tools were developed to suit the needs of many types of machine operations. Quantities of these standard tools are stocked in the Central Carbide Room, and enough tools are drawn out by the Touch-Up Stations for each 24-hour working period.

The Central Carbide Room stocks and prepares all carbide tools for their initial use in the shops. For economy, standard single-point tools up to and including ½-inch tools are purchased already tipped. However, substantial savings in both time and money are effected by purchasing carbide tips for all single-point, special and multiple tools over ½ inch. These latter tools are tipped and ground in the Central Carbide Room. The equipment for

grinding consists of the following:

1. Two 14-inch and one 10-inch double-cup wheel carbide grinders for single-point grinding.

2. One heavy duty and one light duty

vertical milling machine.

One cylindrical grinder.
 One chip breaker grinder.

Practically all brazing is performed by means of an induction heating unit, although acetylene gas torches are still occasionally used. A dust and fume exhaust system services all grinders and the two brazing tables.

In the Central Carbide Room, shank material is cut to length, the relief and rake angels are milled with carbide tools, the pocket is recessed to tip shape with carbide milling cutters, and the tips are brazed to the shanks. The tools are then rough ground on 14-inch silicon wheels and finish ground on 6-inch diamond wheels. After finish grinding, the tools are held in stock until withdrawn by the various Touch-Up Stations.



Fig. 2—A typical Touch-Up Station at the New York Naval Shipyard where carbide tools are finish ground and stocked for use in a designated area.

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No	SEQUENCE	Dia	D. Ol Cut	RPM	Feed	Stop	Clip	Tool No.	S.F.M.	REMARKS
1	SPOT DRILL DRILL	17/32	39/64	.187	.011	HEX. HEX.	TUR. TUR	H.S. DRILL H.S. DRILL	95	
2	REAM TURN	11/4	1/64		.037	HEX.	TUR.	H.S. REAMER 788-T410	20 420	
3	TURN	21/8	7/32	460	.011	2	2	76B-T410	360	
4	TURN	13/4	3/16	460	.011	3	3	78B-45°R N.	260	
5	FACE	3"	1/16	460	.073	4	4	788 - T15	360	
6	FACE	13/4	1/16	460	.073	5	-	78B-T15	230	
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Disciplinary Action Will Be Taken Against Anyone Grinding A Carbide
Tool Without Proper Authority.

DO NOT HANDLE CARD IF IN DOUBT ASK YOUR APPLICATION MAN

Carbide Tools Must Be Returned To Tool Room As Soon As Job Is Completed.

Fig. 3—A carbide application card used at the New York Naval Shipyard. Data compiled by the application men is recorded on this card to ensure best machining methods, facilities setting up a job, and permit use of less skilled operators.

Touch-Up Stations

A view of one of the Carbide Touch-Up Stations is shown in Fig. 2. The Carbide Touch-Up Stations in the Ordnance and the Inside Machine Shops are located to service definite areas. Their location is governed by the extent of carbide application in a given area, and the size and location of the shop section.

For example, in the Inside Machine Shop, one Touch-Up Station services a relatively small area which contains 135 turret lathes. Here 95 per cent of all tooling is with carbides. Another station, however, services three floors where only 75 per cent of all tooling is with carbides.

In all, five Touch-Up Stations promptly take care of the needs of the two Production Repair Shops. All special tools used in the designated area and all standard tools required for a 24-hour period are stocked in the Touch-Up Stations. Finish grinding operations on tools on which less than $\tau_{\rm lg}$ inch of stock must be removed are performed at the stations. Tools requiring more than $\tau_{\rm lg}$ inch stock removal are returned to the Central Carbide Room for rough and finish grinding. Spare milling cutters for those being used in the section, or cutters that are expected to be used during a 24-hour period, are also stored in the Touch-Up Stations.

The equipment maintained in each Touch-Up Station depends upon the needs of the area serviced by that station. For instance, the turret lathe Touch-Up Station is provided with the following equipment:

1. Two 10-inch aluminum oxide bench grinders for grinding steel shanks.

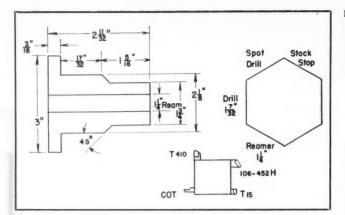


Fig. 4 — For turret lathe work, additional information is compiled on the back of the application card, including a sketch of the workpiece and the tools used on each operation.

application instructors may be said to be similar to that of set-up men in a production shop, their duties including

designation of sequence operations, the r.p.m., the s.f.p.m., feed, depth of cut, and the correct grade and style of carbide tools used. When possible, all of this data is compiled **before** the job is set up on the machine, with the aid of advance information secured from the planning office.

Carbide Application Cards

Pertinent information and data compiled by the application men is recorded on a carbide application card, as shown in Fig. 3. This card is posted at the machine and remains there until that particular job is completed. Although the application instructors set the machine standards on each operation, it is the duty of the regular floor supervisor to see that the instructions on the card are followed. Upon completion of the job, the application card is returned to the local Touch-Up Station and filed by job plan number for future use.

For turret lathe work, however—where several operations are performed in sequence on the same machine—additional information is provided on the back of the application card, as shown in Fig. 4. On this side of the card is a process sketch of the workpiece, together with a sketch of the corresponding tool used on each opera-

Two 10-inch silicon cup wheel grinders—one wet and one dry—for rough grinding carbide tools.

3. One 6-inch diamond wheel for finish grinding carbide tools.

4. One chip breaker grinder with a diamond wheel for grinding chip breakers.

Two cutter grinders equipped with diamond wheels for grinding special carbide tools.

In another section—where a variety of machine tools not requiring an extensive use of carbides are located—the Touch-Up Station is provided with the following equipment:

1. One 10-inch aluminum oxide bench grinder.

One 10-inch silicon cup wheel grinder.

One 6-inch diamond wheel grinder.
 One chip breaker diamond wheel grinder.

Carbide Application Men

Thirty-five carbide application men are assigned to the Touch-Up Stations. These men are responsible for the application and control of all carbide tools used in their respective sections. They also supervise the work of the grinding personnel in the Touch-Up Stations.

In general, the work of the carbide

1874



215 square feet



1 h. p. CONE TYPE UPRIGHT DRILL

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... of manufacturing metal drilling machinery, we extend our
thanks and appreciation to industry throughout the world, for
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tion. Each operation and each tool is numbered correspondingly to show the correct sequence. Advantages of this procedure are:

- 1. It ensures use of the best machining methods.
 - 2. It facilitates setting up the job.
- It permits use of less skilled operators.
- 4. The card of course is a valuable record whenever the job is repeated.

Carbide Tool "Floor Plan"

For the control of tools in each section, the application men make use of a form known as the "Carbide Floor Plan." A drawing of one of the plans is shown in Fig. 5. A space is outlined for each machine tool in the particular section covered by the plan. As tools are drawn from the local Touch-Up Station, the quantity, type, and grade

	EL 599 24"x 72 omt tool / 7-/2		EL 681 20" x 12" amt tool# / 7-903	18	808 "x 60" t too! 7-704 7-723	18	807 "x60" 1001# 7-78 7-48	18 omi	806 "x 60" 1001# 7-/304 7-/404 Berny Berny	16	661 *x 30* too!*	16	-605 "x 30" tool # 7-5-L	16	819 "x30" tool#	16	1 × 30" 1 × 30" 1 1001# 7-/5 7-75 7-78 7-/8 In Least
- 680 "x72" 1 1001# 7:110 7:1906 7:903 7:306	EL 679 20" x72 amt tool / 7-7-7 / Barry	# 2" # 24	EL 669 14" x 30" amt tool*	14	67! " x 32" ! tool # 7-/8	ami	673 " x 30" 1001# 7-78 7-45	14	- 672 " x 30"	14	674 * x 30" tool # 7-43 7-73	14	670 * x30* tool * 7- 703 7-/303	14	675 *x30* tool*	16	802 * x 30* tool®

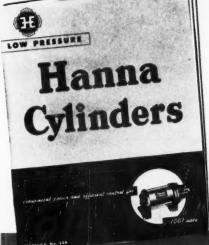
Fig. 5—This sketch shows the Carbide Floor Plan, used at the New York Naval Shipyard. On this plan, the number, type, and grade of each carbide tool is recorded in the space alloted to the machine on which the tool is used.

It has been found that the process drawing and the indication of the sequence of operations serve as in incentive to both application men and machine operators to develop and suggest improvements that result in savings in time and effort. Since the card remains on the machine until the job is completed, necessity for turning in the tool at the end of each shift—or making one man responsible for the tool is eliminated. Time is saved also by permitting immediate resumption of the operation when shifts change.

of carbide are recorded in the space alloted to the machine using these tools. The information remains on the Floor Plan as long as the tools are being used on the machine.

When the tools are returned to the Touch-Up Station from whence they were drawn, the data is crossed off of the Floor Plan, thus showing that the tools have been returned. In this way the Floor Plan makes it possible for the carbide supervisor to locate and make a periodic check on all carbide tools in his section, in order to deter-

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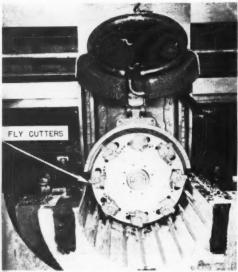


Fig. 6-Milling head in cutting position showing grooves in a half-bearing, and the facing plate equipped with carbide tipped fly cutters.

mine when regrinding is necessary, and also to make certain that performance is satisfactory.

Carbide Training Program

Due to the difference between the operating speeds and the cutting characteristics of carbide tools and those of HSS tools, it was necessary to give the application men a thorough basic training course covering the manufacture, design, application, and grinding of carbide tools. In addition to this basic course, the application men now

attend meetings perhaps once a month where they are brought up to date on developments in carbide tooling and where they also develop and work out systems and procedures for standardizing control and application of carbide tools throughout the shipyard. Furthermore, to help obtain full support of the program, a brief course on general rules for the use of carbide tools was given to shop supervisors.

Special Tooling

A large variety of special carbide tools have been developed and are in use at the shipyard. These include:

1. Grooving tools, 1/4-inch up to 1 inch, for machining to a depth of 2 inches.

2. Boring tools, ground with a special angle for a particular diameter, bore, and shoulder contour.

3. Radius tools, both concave and convex, ground with a special radius for a particular job.

4. Multiple form tools for valve bodies and valve seats.

When such tools as these are made

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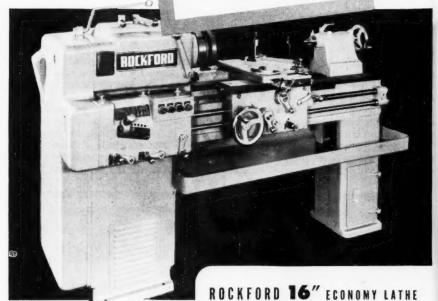
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up for a particular job, they are stored in the Touch-Up Stations in a box containing all of the special tools for that particular job. A sample of the part, together with a description of the tool, is mounted on the outside of the box for identification. This system for the control of special tools is used in conjunction with the application card for each special job.

An example might also be cited to illustrate the effect on machining time and costs with the use of carbide tools.

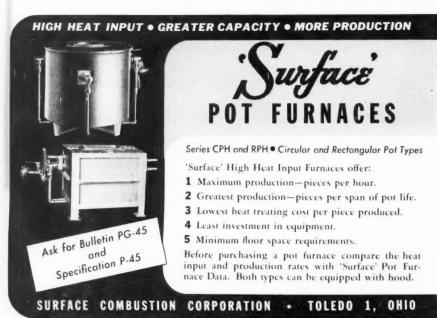
Milling Shaft Bearings. Use of carbide tools permitted the development of a rapid machining method to supplant a slower and more cumbersome technique in use for milling shaft bearings.

Shaft bearings are composed of two semi-circular bronze castings, 12 to 14 feet long and with an i.d. of 23 inches. Ten dovetail grooves, which are later filled with strips of rubber or lignum vitae to support the shaft, must be ma-

chined longitudinally in each halfbearing. Machining each groove individually on a planer required 60 hours for each half-shell.

A multiple head milling cutter was fitted to the cross head of the planer, as shown in Fig. 6. The head holds 10 pairs of carbide tipped milling cutters—one pair for each groove to be cut. The cutters are driven through a telescoping shaft by a motor mounted on the rear of the planer to allow full travel for the planer table.

The half-bearing is placed in a semicircular cradle on the planer table and fed into the cutters, rotating at 400 r.p.m. (320 s.f.p.m.), at a rate of 0.001 inch per tooth by means of the table travel. All 10 grooves are rough cut with one pass of the table. The leading cutter sizes the bottom of the groove; the following cutter dovetails the groove. The roughing cutters are replaced with finishing cutters for the second pass. At the same time, 8 Car-





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boloy fly cutters mounted on a face plate are used to bore the bearing to the correct i.d. The face plate-rotating at 110 r.p.m (690 s.f.p.m.) with a feed rate of 0.008 inch per tool-is powered by the same motor. When a

number of bearings are to be machined, they are all rough machined and later finish machined. The change in machining procedure enabled the machining time to be reduced from 60 hours for each half shell to 3 hours.

The Use and Care of Saws

By CARL W. NOFFKE

THE saw is a highly essential tool which is used in just about every craft and industry, and yet it is one which is considered to be a common tool by most users. The low purchase price of many saws and saw blades, such as those which may be purchased in "dime" stores, has proved to be a bad influence on those people who use saws in industry; the average individual does not really appreciate the quality and value of industrial saws such as circular metal cutting, milling, slitting, and cold saws. This lack of appreciation results in the careless use of saws. The five most flagrant examples of carelessness are as follows:

(1) Operating dull saws.

(2) Sharpening the saws improper-

(3) Using the saws without coolant. (4) Running the saws with excessive

speeds and feeds. (5) Failing to keep the work rigid while sawing.

A remarkable savings in saw life and in production may be made by teaching the personnel who use saws about their value and proper care. Saws are produced to the same precision accuracy as are drills, reamers, taps, and other cutting tools; and therefore they should be treated with similar respect. The most rigid saw tooth is designed to have a large radius in the gullet and a compound curve on the back of the tooth, and

this tooth shape produces a curled chip cutting action. By providing alternate beveled teeth on a given saw, the chips produced by the saw are trisected so that no single saw tooth cuts the full width of the kerf.

In order to obtain both maximum saw life and production, the original tooth shape of the saw should be retained; results from tests have shown that more saw life is destroyed by sharpening (usually improper) than by actual sawing operations. Metal saw sharpening machines have been designed and manufactured in which the original tooth shape of a saw may be reproduced automatically while removing only .010 to .015 inch of stock. However, in many tool rooms, saws are still sharpened in a conventional way on standard cutters or saw grinders, grinding in complete new tooth shapes, usually vee teeth. This improper method not only removes .030 to .060 inch of stock from a saw, but it also requires three times as many man hours as the proper method.

By using the proper type of profile saw sharpening machines, saw life may practically be doubled while, at the same time, production may be increased and saw maintenance costs reduced. Don't neglect saws; sharpen them as carefully as you would other production cutting tools. By doing this you may save tool costs and man hours, and decrease production costs.



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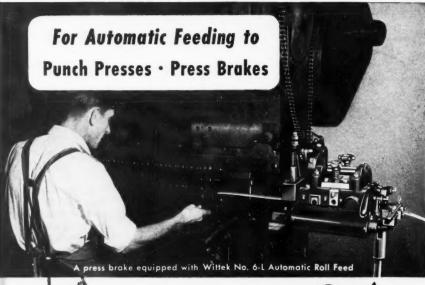


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An Analysis of Blanking Die Designs, Part VI

C. W. Hinman

The author describes tandem and follow dies that are designed for perforating and blanking operations.

By C. W. HINMAN Designing Engineer

In this article the term "tandem dies" is used to designate the two-station type of blanking and forming dies and the term "follow dies" to designate those dies having more than two stations. Follow dies, incidentally, may be built with as many as five or six work stations, and may even approach the design of a progressive die.

Figure 1 shows a sketch of a brass perforated blank. The tandem die illustrated in Fig. 2 was designed for the production of the blank. The parts of this die lettered A, B, C, D, and E represent a commercial die set of the

Section Y-Y

Fig. 1—Sketch showing a perforated sheet brass blank that is produced in a twostep die at the rate of one blank per press

type having two guide posts located in the rear. These letters refer to the die shoe, punch-holder, punch shank, two tool steel hardened and ground guide bushings, and the guide posts respectively.

Parts F and G are the tool steel die block and blanking punch, and H is a machinery steel channel stripper plate positively attached onto die block F. The scrap cutter is indicated by punch I. This punch is designed to cut off the scrap strip against the left edge of the die block. The cut lengths of scrap strip are equal to the blanking center distance. As the scrap strip is cut at each down stroke, the pieces fall from the die shoe into a container placed at the left side of the press. This cut-off feature of the die provides a good disposal method for long unwieldy lengths of scrap strips which are a problem in a pressroom. At J, one of the cut lengths of scrap is shown as it falls from the die.

At K is shown a machinery steel punch plate which is attached to the punch-holder. This punch plate holds and a ligns the four perforating punches N. A good rule to follow in designing a punch plate is to provide for a thickness 1½ times the body diameter of the perforating punches. This type of construction imparts a stiff alignment to the perforating punches with their corresponding die holes. Many dies are made with punch plate thicknesses less than that sug-

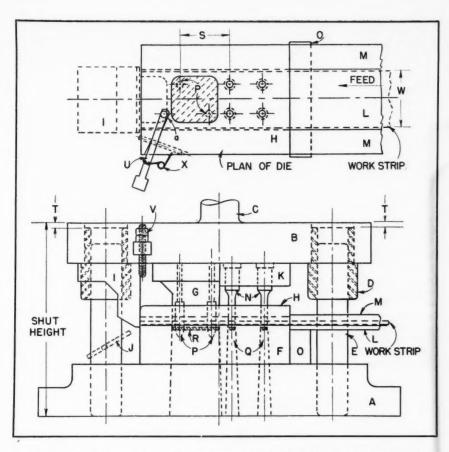


Fig. 2—Design of a typical two-station perforating and blanking die that is provided with a scrap strip cutter.

gested by the rule, with the result that the cutting edges around the punch edges and the die holes become nicked or sheared.

Parts L and M are the feed table and guide strips for entering the work material. Both of these parts are supported by block O. Letter P shows two pilot pins situated diagonally in the blanking punch face. These pins have bullet nosed points which are designed to enter previously pierced holes in the work strip and thus align the blank

contour with the pierced holes before cutting the blank. At Q, the slug outlet holes which are bored through the die block and shoe are shown. Experience has taught that if the clearance angles of slug outlet holes are ¼ deg., on a side, and begin about ¼ inch under the die face, and are continued down through the die shoe, the cut slugs will not jam together, but will freely fall out underneath the press. Dies in which this precaution is not followed frequently experience

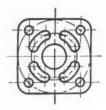


Fig. 3—Sketch showing a perforated blank of the type which requires a fourstation die for producing one completed piece per press stroke.

jammed outlet holes packed so tightly that slugs must be drilled out. The down time necessary to correct this condition interrupts production, and costs both time and money.

R shows the position of a cut blank. S is the blanking center distance, or the

feeding distance between die stations. **T** is an oil pocket, one being provided over each guide post. In new blanking dies, the height of guide posts is made ½ inch less than the shut height of the die. Guide bushings **D** are provided with oil grooves along the inside surfaces of their working areas to distribute oil on the guide posts

while the punch-holder reciprocates up and down. The enlarged shoulders of the bushings are of sufficient length to prevent exposing the ends of the posts at the extreme upstroke, so that a sufficient amount of lubricant is always confined in the bushings.

An automatic finger stop is shown at U. The slot in stripper plate H for the finger must be loose at point a so that the gauging end of the finger can move freely back and forth in a direction parallel with the strip feed. Width of the slot at this point should provide a clearance equal to the thickness of the material strip. The finger, although fairly tight at its fulcrum pin, should be able to touch both sides of the widened slot a.

The vertical trip pin attached on the punch-holder at V is adjustable as to height, contacts the pad on U on the down stroke, and forces the upper end of the finger up, but not until after the blanking punch has entered the



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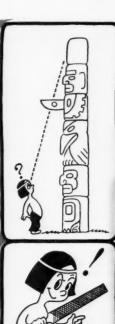
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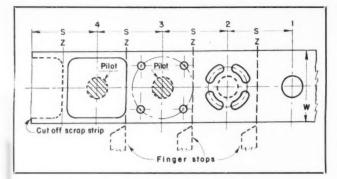


Fig. 4—Scrap strip of a four-station die layout for producing the perforated blank shown in the sketch Fig. 3.

used here, but with easy sighting, it is sometimes omitted in tandem dies. The ram, in descent, perforates four

holes at the first station, and when the punches ascend, the strip is advanced against the finger stop. On the next descent, the pilot pins in the blanking punch engage in their corresponding holes and ensure that the contour of the blank is cut in correct relationship to the holes.

The job is now ready to be run at high speed tempo with the clutch "wide open," that is, with the clutch pedal depressed in constant engagement, until an entire length of work strip has been cut into blanks. By using coiled stock, the entire coil may be used before it becomes necessary to stop the press and mount another coil. Therefore, using coiled strip saves much time and increases hourly out-

In a press making 80 stokes per minute—and some types of gap-frame presses can easily make 50 per cent

die. In this position, tension of spring X, causes the finger to hug the side of the slot nearest the die opening. The successful operation of the finger depends upon the stop coming down on top of the material strip when the ram ascends, and not in the blanked opening from which it was just lifted. This feature permits the strip to be fed ahead and the stop to contact the right edge in the next blanked opening.

Dimension W represents the width of the material strip. About 0.005 to 0.010 inch clearance is allowed in the width of the stripper channel H and between guide strips M—M to permit feeding without interruption.

Operation of the Die

The work strip is fed under the stripper plate until the forward end is flush with the right edge of the blanking die opening. A finger stop could be

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of the wrist changes speeds in the standard range; no tools required. Lower photo shows how cable is piloted (on ball bearings) for smooth operation — away from the pulley, a design feature to protect operator and work. Standard heavy duty ½ to ¾ hp. motor with overload protection. "Series M" KELLERFLEX comes to you permanently balanced for floor or bench stand or suspension, with standard fittings for standard equipment.





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more strokes-the operator may be able to "catch" one-half of the press strokes, which allows for entering a new strip. Therefore, at 40 blanks per minute, 2,400 finished pieces can be cut per hour, less the usual 10 per cent, leaving a net production of around 2.100 blanks. The strip should be lubricated to prevent metal to metal contact between the punches and work strip. Several good commercial oilers for lubricating the strip are available on the market.

The press tool just described could have been designed as a compound die, such as was illustrated and described in the article which appeared in the August issue, and a more accurate piece of work could be produced at one station and a single stroke. However, a compound tool would require the building of an inverted die, which might not be necessary for the work in hand. A compound die would cost nearly twice as much as the tandem die, and the hourly output would not be increased materially.

A Four Station Follow Die

Figure 3 shows the same blank contour as produced in the above tandem die, but with the addition of four arc segments and a large center hole. It is obvious that a tandem die design would not be practical for perforating and blanking this piece because the edges of the holes are too close together to permit perforating them all in the first station. The die block would be difficult to machine and work out. The die would require the use of numerous inserts, or it would probably fracture when heating and hardening. A die engineer is frequently confronted with these, and similar adverse conditions. The remedy is to distribute the holes among several stations, as shown in the scrap strip layout, Fig. 4.

In designing progressive and follow dies, it is always good engineering practice to first make a tentative layout of the scrap strip in order to as-



NEW Colonial UNIVERSAL BROACH SHARPENER

In sharpening a round broach on this Universal sharpener, the wheel is brought to depth on the first tooth. The "Step-Stop" slide is locked. The operator shifts to the next tooth and brings the wheel to full depth—to a definite stop. To his right is a micro-feed wheel with which he increases depth an amount equal to the step of the tooth. When the next tooth is ground the "Step-Stop" lets the wheel come in to this increased depth before hand-feeding with the micro-feed is required.

Where the step-per-tooth is small, the operator frequently can grind 3 or 4 teeth without using any hand feed—he just brings the wheel up against the stop each time.

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This is just one of the features of the new Colonial Universal Broach Sharpener shown here. Others include: New center-point steady rests for quicker setup; Lowinertia head; Dual head-slide handles to make both round and flat broach grinding as easy as possible for the operator... and all the other features which make Colonial's 1949 sharpeners "tops" for accuracy and speed.

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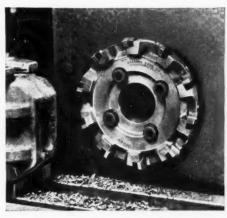
708 East 163rd Street Cleveland 10, Ohio certain its possible faults, and to eliminate as many faults as possible by altering the design before laying out the die itself. This procedure saves many a headache and much time and unnecessary expense.

The follow die under discussion is mounted in a longer but similar die set as that which was used for the tandem die. It is necessary to employ finger stops so that, when entering a new strip, it can be halted easily by depressing a finger stop, for piercing the holes at each station. The finger stops slide on the die face and through slots which are cut under the stripper plate. Each finger stop is provided with a light compression spring that pushes it out to normal position, shown in the sketch, for clearing the strip after being used. Finger stops eliminate guesswork when starting a new strip. and eliminate fractional cuts that may deflect punches and fracture cutting edges, consume unnecessary time, and miscut several blanks which would increase the amount of material wasted. The hourly output from this follow die will be slightly under that of a tandem die because of the extra time required to start a new strip.

Our next article in Modern Machine Shop will analyze several types of special blanking and cutting dies which are designed for use in unusual operations.

Tap Driving Equipment. A 20-page folder (No. 123-1) issued by Scully-Jones & Co., 1909 S. Rockwell St., Chicago 8, Ill., presents illustrated, descriptive, and tabular information, including prices and specifications, on standard tap chucks, heavy duty tap holders, spring compression tap holders, tension and compression type floating tap driver holders, and close center tap drivers for use in machines having a spindle holder or attachment with Morse taper holes, multiple tapping machines, and spindle type machines made to accommodate standard adjustable adapter assemblies. Copy free.

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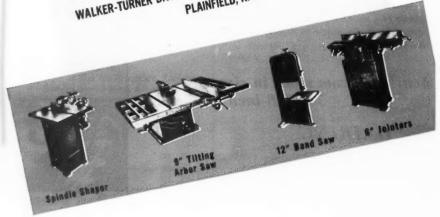


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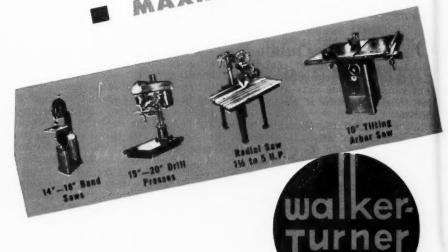
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W. R. Bennett

Practical Pointers on Steel Treating, Part IX

By W. R. BENNETT

In concluding this series of articles, the author discusses pack hardening high-speed steel, long draw, high carbonhigh chrome steel and hardening splined shafts.

ONE OF THE high-speed steels in general use at this time is the 18-4-1 type—eighteen per cent tungsten, four per cent chromium, one per cent vanadium plus sixty-five to seventy one hundredths of one per cent carbon.

We know that the elements, tungsten and carbon, are responsible for the results obtained from a correctly hardened high-speed steel. We also know that, in order to obtain these results, we must resort to excessively high heats for hardening—heats approximating from 2200 to 2375 degrees Fahrenheit. These high temperatures are not successfully obtainable in the pack hardening operation. Consequently, if we are to pack harden, we must employ heats ranging from 1700 to 1800 degrees Fahrenheit.

Practically all of the compounds used in pack hardening high-speed steel contain carbon to a greater or lesser degree. The fundamental reason for employing the pack hardening method has been to prevent oxidation. The temperatures advocated and the

amount of time that packed pieces are subjected to the heats mentioned above are sufficient to bring about a carburizing effect. The surface of the steel so treated will show evidence of having been carburized and, in many instances, this surface will lift off from the body of the steel to a depth equal to the depth of the case. While this case lifting often occurs before grinding, it does, however, invariably develop after or during the grinding operation. It is quite true that a carburized piece of high-speed steel will show equally as high a Rockwell reading as will a correctly treated piece. It will not, however, withstand the speeds and cuts and after a few grindings fails completely.

In the final analysis, pack hardening high-speed steel is unnecessary. It fools no one but the operator of the tool and does not fool him for long.

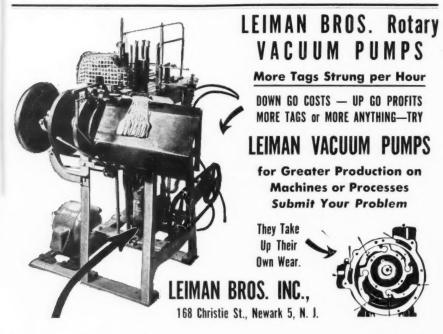
There are instances, however, when the steel treater is forced by circumstances to resort to certain methods not to his liking but to placate an obdurate customer.



It may be well to relate an incident resulting from pack hardening highspeed steel. The writer was requested to re-harden a high-speed sub-press die which had been previously pack hardened. As a result of neglect, the die had become distorted approximately seven thousandths of an inch. After grinding and fitting, it was placed in the press and found to be too soft for satisfactory performance. Consequently, it was necessary to re-harden. The die was handed to a young man who was continually hardening high-speed steel. He was not, however, informed that this particular die had been previously treated. By careful pre-heating and strict attention given to the final heat and quenching in a hot salt bath, maintaining a temperature of 1200 degrees Fahrenheit, he succeeded in hardening the die perfectly. The distortion checked one thousandth of an inch. The practice of heating in a semi-muffle furnace, running under proper temperature and correct atmospheric conditions, then quenching on a rising heat, in a hot salt bath, resulted in full hardness and decreased distortion.

The cause of the trouble experienced in pack-hardening was undoubtedly due to the fact that the die was "Soaked" at dormant heat for a much longer period than necessary. Pack hardened high-speed tools do not give quantity production and after a few grindings, have lost quite some of their hardness. Temperatures generated inside of the containers are often greater, due to internal combustion, than actual oven temperature. The objectionable features of quenching at a dormant heat and soaking are in evidence.

With careful heating and modern cooling mediums, it is possible to produce a better hardened high-speed tool with respect to surface conditions, distortion and longevity.





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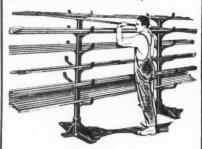
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OF ALL METAL CUTTING JOBS



HOW YOU CAN BOOST YOUR PROFITS

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



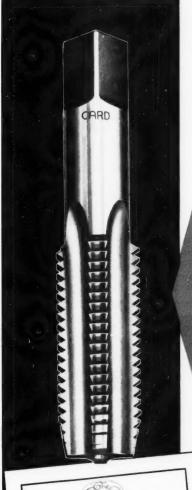
Any time you require additional storage space, all you need do is to add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist: depreciation is practically nil. SEND FOR BULLETIN No. 26-P DESCRIBING THE BROWN TIME-SAVING RACK.

BROWN ENGINEERING CO.

120 N. THIRD ST. READING, PA.

During the First World War, the writer was called upon to pack harden a large quantity of high-speed steel tools, in order to help a party who appeared to be in dire straits. The first lot of work consisted of a quantity of small broaches, intended for use in broaching a part of the breach mechanism of the Russian rifle. These tools had been previously hardened, ground and stoned to a finished cutting edge. Because a Russian inspector could scratch these tools with a Swiss file, they were rejected. The gentleman told me that he had previously contacted several representative tool factories and had been politely informed that the broaches could not be rehardened with the slightest degree of success. It was finally suggested that he bring the matter to my attention. After hearing his story and being informed that a final rejection would entail a loss of ten thousand dollars, I advised him to leave the parts with me, to go back to New Haven, sit in a chair, smoke a good cigar, put his feet on his desk and forget them until the following afternoon at three o'clock, at which time they would be ready for him. After expressing amazement, he returned home. He came back the following day at the appointed time and carried away the tools. They were accepted by the inspector and my customer received his money.

These tools had been placed in an iron box and packed with old carburizing material. The box and its contents were placed in the carburizing oven and allowed to remain at carburizing heat for about five hours. The entire contents of the box were then dumped in a tank of oil and afterward dried. The soft exterior carburized and hardened, resisted the file and were accepted. As a matter of fact, these tools had been hardened perfectly in the first instance. The latter hardening was certain to give poor results, insofar as production was concerned.



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The Long Draw

Unquestionably, retarded cooling after a tool has been hardened and drawn will add to its toughness without decreasing its hardness. If commercial steel treaters were required to religiously follow the specifications which appear on some orders, pertinent to the long draw back required, it would necessitate the employment of numerous heating units for a long period of time, increase the cost, and slow down production. When specifications call for a 400 degree draw back for a period of five hours, on a die already hardened, we may use any heating medium or equipment to accomplish our objective. The medium in which the die is contained is gradually brought to the required heat and the temperature maintained for a period of five hours. Undoubtedly, the piece being heated has dropped to the desired temperature, long before the

time specified. It is, however, allowed to remain its full time and is then either quenched or permitted to cool in air to room temperature.

If the tool is quickly quenched after the "Long Draw," we are in a great measure defeating the purpose. If we allow it to cool in air, it is materially benefitted. It has been demonstrated in "Long Draw" practice that greater toughness is obtained than by the "Slow Cool Down." It is unnecessary to prolong the drawing time after saturation has been reached. A much longer time for cooling than either by air or the quick quench should be employed. We are all aware that insulation, when correctly applied, will maintain heat or cold over an extended period of time. It is the slow cooling that develops toughness and in order to accomplish this, it is only necessary to place the tool in a box after it is removed from the drawing furnace and pack it well with ground asbestos or



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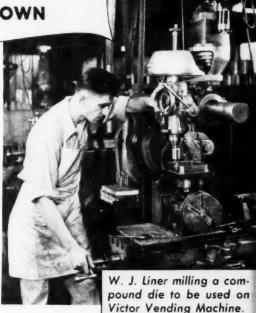
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any other suitable insulating material. This procedure applies to any steel. A tool weighing five pounds will, if subjected to this method of cooling, be warm to the touch after about twelve hours. Results; No furnace hold-ups, no added costs and a tougher tool.

High Carbon—High Chrome Steel

This type of alloy steel is available in various combinations, permitting both oil and air quenching. Due to inherent brittleness it is not as readily machined as many other steels, even in the supposedly annealed state. This steel is exceptionally satisfactory for blanking dies, particularly those which are used in cutting silica stock for laminations for electrical work. All types of this steel are very susceptible to oxidation during heating for hardening. It is important, therefore, that strict attention be paid to atmospheric

conditions.

There have been times when a press operator expressed great satisfaction with the great quantity of blanks turned out at a single grinding of the blanking die, only to find later that cutting edges revealed slight crips or breaks which necessitated the removal of considerably more stock from the face by grinding than would otherwise have been necessary, if fewer blanks had been cut after each grind. As a result of the excessive work, the steel became tired out or fatigued. It is good practice to determine a set quantity of blanks which normally would be expected from each grinding and then grind off a couple of thousandths, irrespective as to whether the die apparently needs it or not. It is also a good policy to re-draw the temper occasionally, inasmuch as this practice appears to have a tendency to rejuvenate the steel.



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Feed—1.162 min. Speed—335 RPM
Cutting Time—50 min.
Tool Life—350 pces. sharp.
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KEO CUTTERS

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Pack Hardening High Carbon—High Chrome Steel

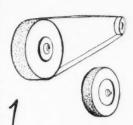
Practically all of the manufacturers of this type of steel recommend pack hardening in their instructions for heat treatment. From their point of view, they may be justified, inasmuch as they are aware that pack-hardening softens exteriors to an appreciable extent. It is undoubtedly true that they are aware soft exteriors are the result of faulty oven atmosphere. They also know that this particular steel is more susceptible to this condition than many others.

By no stretch of imagination could they succeed in bringing about much needed results with a few written suggestions. Consequently, they advise pack-hardening. Without entering into a discussion of chemical change which may be the result of pack-hardening, we must admit our chief objective is to obtain surface hardness.

It appears reasonable to assume that steels with high carbon content would not take on added carbon during the heating period, irrespective of what the packing material might be. We do know, however, that pack-hardened Hi-Carbon-Hi-Chrome steel is susceptible to surface cracks as the result of grinding. We also know that this steel is more difficult to grind and if, by careful grinding, we are able to remove the first ten thousandths without developing checks, we can then, at necessary intervals, continue the grinding process with little or no danger of subsequent checking. It is general practice to oil quench these steels from the pack. The possibility of distortion or cracking in the quench is not lessened by pack-hardening. Hi-Carbon-Hi-Chrome steel, heated in a properly constructed furnace, running under correct atmospheric condition, may be hardened perfectly without the seeming necessity of packing, thus saving time and eliminating any posIF YOU ARE

Grinding Polishing or Finishing

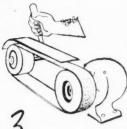
Here are 7 reasons why the coated abrasive backstand belt method is best for you.



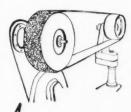
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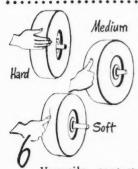
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Armour and Company 1355 West 31st Street Chicago 9, Illinois sible ill effect resulting from packhardening.

This particular steel, unlike many others, must be allowed to "soak" in the oven for a period of time which is in proportion to the size of the piece after hardening temperature has been reached. The reason for this is accounted for by the presumable "Lag" due to the chrome and carbon content and also for the diffusion of carbides.

A goodly quantity of this steel is of the air cooled type. If we heat as described and with no oil quench, allow it to cool in still air, we find, after the piece has cooled to room temperature, a soft exterior with an exceedingly hard sub-surface. This soft exterior is caused by oxidizing action during the air cooling step. One would assume that this method would be safest to adopt, if we could only eliminate the soft surfaces, inasmuch as the possibility of cracking and distortion is

negligible. The answer reverts to the exclusion of the attack of oxygen during the cooling period. If, when the piece has been removed from the oven, it is quickly submerged in a molten cyanide bath, immediately withdrawn and allowed to air cool, there will be no soft exterior. The salt will hermetically seal the piece to the exclusion of air. When cold and not until it is cold, it may be placed in warm water and the salts dissolved. The piece will be uniformly hard, free from surface defects, with no cracks and no distortion. Like other steels, it should not be pre-heated to a degree wherein it will invite scale. The final heating step should not be forced and oxygen must be excluded during the heating.

If the advice as given is carried out, there can be no different steps taken with this steel than with any other steel.

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September, 1949

MODERN MACHINE SHOP

151

Hardening Splined Shafts

Heretofore, in a previous article, the author has stated that poor design does not necessarily hinder the experienced steel treater's success. Attention is called to the difficulty experienced in hardening splined shafts. These shafts are usually made from straight water hardening carbon steel or from machinery steel carburized and hardened. When these shafts are splined on one side only, they are certain to become distorted during the quenching operation and not in the heating step. Unquestionably, this is due to poor design. If the shaft were splined diametrically opposite, in other words, two splines, distortion would be reduced materially. We are however, in this instance, confronted with a single splined shaft.

If a plastic cement, similar to "Cementite" is forced into the spline along the entire length and allowed to dry,

it will stay during the heating and quenching operations. Without this filler, the quenching action is more abrupt and pronounced. With the spline filled, this rapid cooling on the splined side is materially reduced and danger of distortion is lessened.

The alert steel treater, due to past experience, is aware of the difficulties. He knows that single splined shafts will distort in quenching. He knows just which way they will distort and he also knows about how much they will spring. If, in his opinion, a certain shaft will distort 1/32 of an inch in the quench, he will, before he proceeds to heat it, spring it over the opposite way an equal amount. He then quenches it. The same cause for springing still exists but with the result that it will spring back to its original alignment or sufficiently close to the original alignment to obviate the necessity of straightening and will be within grinding tolerances. The above



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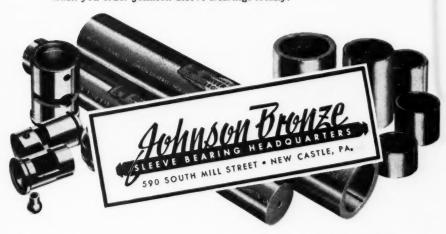


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make available to users most of the bearings they need. These stocks include General Purpose Bearings in over 850 sizes, Electric Motor Bearings, Graphited Bearings, Babbitt Metal, and Johnson Universal Bronze Bars.

As a "pipe-line" to these distributors, twenty factory branches are established in principal industrial areas, with large and complete stocks in each territory. Therefore you are assured of prompt service when you order Johnson Sleeve Bearings locally.



demonstrates the means and measures a smart hardener will adopt in order to circumvent poor design.

What Type of Steel for the Job?

Who shall determine the type of steel to be used on a specific operation? The responsibility for this decision should not fall on the shoulders of the foreman of the tool or die department. He has enough to do in order to keep his own department running at full efficiency. It should not be the die or tool maker. His time is devoted to his specific work and unless he is especially qualified, he is not in a position to express an opinion. It also should not be the duty of the boss hardener. His entire time must be devoted to his own department in order to maintain it running on an even keel. Neither should the purchasing agent be expected to make the decision. Often times, a steel salesman will recommend to the buyer, a certain

type of steel for a job and insofar as the salesman is concerned, his advice is sincere. He is not however, conversant with conditions inside the plant and consequently is often in error. In the light of the above, one would seemingly be at a loss to determine on whom the responsibility of choosing the steel should be placed.

There are many factories that employ men who make it their business to institute measures for improvements in various departments. Very few of these efficiency men have ever devoted their time to the study of steel in all of its ramifications. Inasmuch as this is true, why not create a new dividend paying job? Consider placing an intelligent chap, a thinker, if you please, as a watch dog? It would be his duty to collaborate with the boss hardener and also with the tool and die department foreman. He should keep a record of every tool that leaves the hardening department. Each tool

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Want to make sure you're using the best blade for whatever type metal or non-metal you're cutting? Then see your Victor distributor. His long experience qualifies him as an expert on hack saw blades, and he'll be glad to give you any help you need. He can show you how to make every stroke count with Victor blades... how to cut faster, easier and more economically.

While you're at it, ask him for a free copy of the Victor Metal Cutting Booklet for your pocket or tool kit and the Victor Wall Chart for your shop. Both are packed with helpful hints on selection, care and use of hand and power hack saws.



should bear a distinguishing mark. He should follow up these tools in their various operations and demand from the operator the quantity of pieces these tools have produced to a grinding or re-sharpening operation. If a die breaks in the press, he should be able to discover the cause, whether it is the result of fault of the operator. perhaps some funny business he is endeavoring to cover up, or if it is the fault of the die. If the die breaks through natural cause, it is possible that the steel is not sufficiently tough. It would then be the duty of this man to locate a tougher steel, possibly of the same type, in order to prevent this recurrence.

If the die in question does not break but produces an insufficient number of pieces before re-sharpening is necessary, it is the responsibility of this inspector to locate another type of steel, possibly an alloy for the purpose. In any event, the inspector should accept all of the responsibilities for the continuance of satisfactory operations. He should be credited with his successes.

It is to be understood that this inspection job is not for a playboy. He must devote his entire time to it. He must appreciate that he does not know all the answers and should realize that "He who make no mistakes, does nothing: He who makes too many, loses his job."

Socket Screw Key Sets in Plastic Paks and metal boxes are illustrated, described, and listed as to sizes and list prices in an eight-page pocket-size two-color folder available from The Holo-Krome Screw Corp., Hartford 10, Conn. Copy free upon request.

Three-Way Solenoid Valves designed for use with petroleum oils, kerosene, gasoline, water, air, and inert gases are covered as to specifications, types, sizes, capacities, operation, and so on, in a fourpage two-color illustrated bulletin (No. 493) issued by the Skinner Electric Valve Division, The Skinner Chuck Co., Norwalk, Connecticut. Copy free.



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> Bulletin No. 17-M (Gives full details

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- Stools
 Tool Boxes
- Desks
- · Tool Trays
- Sorting Files
- · Revolving Bins

New Machine Shop at Gulf Research Laboratories

Specialized Metal-Working Facilities Serve Large Scale Experimental and Related Programs

THE SPECTACULAR growth of industrial research during the past few years has made necessary the enlargement of many laboratory metalworking shops. Outstanding among those recently expanded is the new and modern machine shop of the Gulf Oil Corporation's research laboratories at Harmarville, Pennsylvania.

Dual Function

Planned to function 100 per cent as a "tool" for the oil firm's research and exploratory work, the shop is supplying all metal-working requirements of the laboratories' staff of chemists, physicists, and engineers. It also produces most of the parts required for

Looking down the main floor of Gulf Research machine shop. Glassed-in rooms at left are clerical office, inspection shop, grinding room, paint shop, plating shop, and stock room. Most machines are faced the same way to facilitate supervision and enhance orderliness. Thirty-three benches are arranged along windows at right. The tool cage, which is located in the center of the shop, has been held to a five-foot height so as not to block vision.



A separate grinding room with sound-proofed ceiling contributes to the quietness of the machine shop.

geophysical prospecting equipment made by Gulf and used in its exploration activities throughout the world.

By the very nature of the work, a great many of the parts specified by Gulf's research staff cannot be obtained in the open market. Requests usually are for "one-of-an-item" parts which must be made under closer supervision of the designer.

Products of the Gulf shop probably are more diversified than those of any

similar shop. They range from clocks for bottom hole pressure gages used in oil well drilling and production, to harvesters used to gather pyrethrum daisies for use in the Company's insecticides. Almost commonplace are such jobs as the grinding of crankshafts and the making of complete units or experimental parts for gyroscopes, high altitude airplane engine pumps, oil well drills, various gages, rolling ball viscometers, and a chassis dynamometer.

Among notable "firsts" constructed in the Gulf shop are the airborne magnetometer, used in geophysical prospecting; the Azon and Razon bombs, guided missiles developed for the last war; and marsh buggies capable of traveling on hard land, in mud, or in water, and currently employed in oil exploration work in Louisiana and Texas. Continuing this impressive list is a percussion drill, the modern prospecting gravimeter, and the Gulf two-cylinder test engine.



Another important role of the shop is that of testing cutting and grinding oils. Products developed by the laboratories' Lubrication Division are evaluated here in both normal and special test machining operations. Operators who do such test work are especially trained as both machinists and oil test men, and all evaluations are run under the supervision of lubrication research engineers.

Equipment and Facilities

The new Gulf machine shop has 18,479 square feet of floor space. The main shop and assembly floor occupies 10,676 square feet, while storage space in the basement and mezzanine consumes slightly more than 2,500 square feet. Supervisory offices and supplementary rooms occupy the remainder. The supervisory offices, along the building's south wall, are linked together with an intercommunication system that also is connected with the desks of the various foremen which



Primarily for instrument plating, this room off the main floor of the machine shop was designed by laboratory engineers. Copper, nickel, chrome, silver, gold, cadmium, lead, tin, and indium are used for plating in the four-gallon baths. Blower vent system carries off fumes from top of baths, and lamps are vapor-proofed for further safety. Floor is all tile.

are located in the shop proper.

A grinding room, where a large part of the laboratories' testing of threadgrinding oils is conducted, is partially soundproofed and is included in the row of special shops. Next to it, in turn, is a paint shop with explosion-proof fixtures and a high suction spray booth. The electro-plating room, of

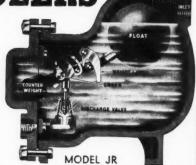
original design, is a model of efficiency and has a tile floor, a blower vent system for removing fumes, and suitable

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How to help your President

... stop passing profits to the scrap dealer

Maybe you have been running antiquated machines so long that your President has come to expect a high write-off for spoilage as a normal production cost. But the "book savings" from operating old, amortized automatic bar machines can be quickly eaten up by the excessive costs of production rejects.

Perhaps a simple reminder—a few case histories on the experiences of some of our customers—will demonstrate to your top executives how the new Acme-Gridley Automatics can "up" your production profit.

We would be glad to send you more of these actual performance records, if you like—or prepare a specific machine recommendation to fit your individual needs.

CUT THIS OUT FOR USE WHEN YOUR PRESIDENT WANTS PROOF

AN ACME-GRIDLEY CERTIFIED CASE STUDY

THIS IS WHAT HAPPENED:

MACHINE—2" RB-6 Spindle Acme-Gridley Bar Automatic

PART TURNED—Sewing Machine Shuttle Blank

MATERIAL-SAE 1112 Bar Stock

OPERATIONS—20, including pick-off and shaving back radius

TOTAL TIME PER PIECE-23 Seconds



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS

built in 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL AGME COMPANY



Located off the assembly bay of the Gulf Research machine shop, this sheet metal and welding room is sound-proofed to eliminate excessive noise on the main floor. Special truck bodies, storage tanks, ventilating units, gear boxes, machine guards, are among the hundreds of items fabricated here.

baths for copper-, nickel-, chrome-, silver-, gold-, cadmium-, lead-, tin-, and indium-plating.

Welding and sheet metal work, including the manufacture of special truck bodies needed for seismograph operations, is carried out in another sound-proof room, next to the assembly bay. All inspections are made in airconditioned, temperature-controlled quarters equipped with a comparator,

an electro-limit gage, a super micrometer, and a jeweler's bench and tools. The stock room carries some 2,600 different items, ranging from waxed paper to steel bars measuring six inches in diameter.

In the center of the shop floor, located so as not to block vision, is the tool cage. Near the supervisor's office, a library table is provided for the men and all metal-working and other publi-



COLD RIVETERS and AUTOMATIC STAKING MACHINES

For staking, riveting, eyeletting, burring, etc., this high speed staking machine (at left) will produce over 1000 pieces per hour. Adjustable hammer blow, easily and safely operated.

This cold riveter (at right) is made in ten sizes to handle work from 1/64" to 2" diameter. Write for complete information. SEND SAMPLES FOR DEMONSTRATION PURPOSES.

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Inspection work of the machine shop is conducted in this air- and temperature-controlled room off the main work floor. It is equipped with all modern gage instruments (many of which the shop makes itself), comparator, electrolimit gage, profilometer, jeweler's bench and tools.

cations of interest to such craftsmen are available.

The metal-working machines of the shop include 24 lathes, 13 milling machines, 6 presses, 12 grinders, a thread grinder, 9 vertical drills, a planer, 2 shapers, a gear shaper, a horizontal-boring machine, a jig borer, an engraving machine, a nibbling machine, a spot welder, 2 arc welding units, 2 power shears, a brake, 5 metal saws,

and miscellaneous small machine tools.

Between 3,000 and 4,000 jobs will be turned out in this shop in the course of a year. A few of these will require but half an hour or less for completion, but some of the larger and more involved assignments will require several thou-

sand hours of machining, assembly, inspection, and testing.

Basic Policies

The shop is operated as a responsibility of Mr. R. J. S. Pigott, Director of the Engineering Division. It is under the immediate supervision of Superintendent F. F. Versaw. The basic policies responsible for its performance and efficiency have evolved as a result

Pictured: a 24-Spindle Heavy-Duty Drill Head.

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of trial and development since this type of work first was started at the laboratories in 1929. Briefly, these policies may be summarized as exact time and cost accounting, careful selection and training of research mechanics, best working conditions in every respect, and tooling and organization of the shop to ideally serve its specific function.

Centralization

Centralization, or the grouping under one roof of all shop and allied services such as welding, painting, and so on, is considered a major advantage over having individual and smaller shops assigned to laboratory departments. Studies proved to the Gulf management that the splitting of functions results in duplication, lost time, and inability to operate all facilities with maximum efficiency. Unification has enabled Gulf to eliminate these wasteful practices.

The shop floor proper has been arranged into three units of machines and benches. Each unit is similarly equipped and virtually is a complete shop in itself. Thus, on any job, the machinists are only a few steps from their benches to any machine they might need.

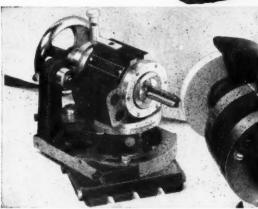
Records

The cost and accounting systems used in the machine shop of the Gulf Research Laboratories are completely detailed. A record for each job-no matter how small-shows total hours. the time the various machines used were operated, and the quantities and prices of material required. Each completed job cost is checked against the estimate and any notable discrepancies are investigated. So complete are the records that each hour of every man and machine can be traced for the past seven vears.

Probably more valuable than any



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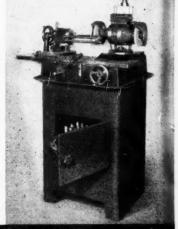
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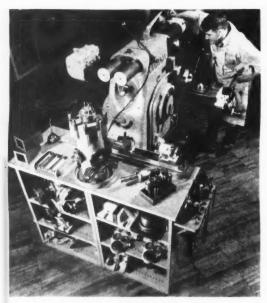
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other single factor is the ability of the shop to render fast service. Although months may be necessary for the concept of a new research development, it almost invariably comes to the shop as a hurry-up job. Certain small items frequently can be placed in the user's hands in a matter of hours. Personal supervision and consultation by the scientist who has asked that a job be done eliminates considerable delay, and time so gained for any research program is invaluable.

It may take months for the concept of an experimental apparatus to mature, but when it comes to the machine shop, it is usually a hurry-up job. Tool racks at all milling machines help deliver finished work in minimum time by eliminating trips to the tool room. Racks carry cutters, parallels, chucks, and all milling machine accessories.

Specialized Mechanical Staff

Obviously mechanics with specialized ability are necessary for the type of work done in this shop. The experimental field is relatively narrow and men with the desired training and experience are so difficult to find that the laboratory has developed a program of training. Each selected trainee serves a 10,000 hour apprenticeship, during

which he does all types of work under the supervision and guidance of an expert craftsman. When his course is completed, he is a full-fledged journeyman schooled in all phases of his particular craft.

One reason for such intensive training is that the Gulf shop does not employ men who are solely machine operators or bench operators. Each worker must have a high degree of initiative and is charged with the responsibility of carrying his assignments

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Avoid costly accidents caused by slipping on oily or greasy floors! Reduce fire hazards! Replace sawdust or wood shavings with Fuller's Earth. Every shop needs this low-priced safety aid. Fuller's Earth absorbs oil and grease—and it's non-inflammable. Write for FREE SAMPLE or trial order at quantity price.

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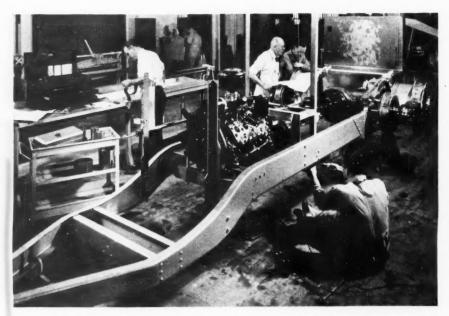
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Automotive equipment especially built for oil exploration, as well as other field research activities, is assembled, equipped and repaired in this assembly bay of the machine shop. Illustration shows work on the chassis of a marsh buggy—a huge-wheeld vehicle developed by the laboratory for prospecting work in swampy and flooded regions.

through all operations to final completion. For the most part, the men do their own inspecting, with the duties of the shop inspection staff being confined primarily to the checking of incoming materials and equipment or outgoing jobs that have been ordered by divisions of Gulf other than the research laboratory.

The fact that the present staff of 90 men is engaged primarily on creative projects, to which their own resourcefulness contributes, increases job interest. Each is aware that he is working in the foreground of science—and is proud of it!



Carboloy "Triple C" Plan pays dividends at New Britain-Gridley



Coordination of carbide teel design and application at New Britain-Gridley, brought about through the "Triple C" Plan, keeps machine down-time at a new low On this draw-boring application, for example all carbide-tipped tools are pre-set in cat heads to exact dimensions. For various sized bores, operator merely changes heads on arbor and has no tool setting to do



The centralised grinding phase of Carboloy's "Triple C" Plan at New Britain-Gridley resulted in an almost-overnight one-third drop in tool breakage Carbode-tipped cutting tools are employed on a majority of cutting facing and boring operations, and have helped lower manufacturing costs, increase production and reduce tool replacement costs.

The New Britain-Gridley Machine Division of the New Britain Machine Co. slashed new tooling costs by one-third since the adoption of a plantwide Coordinated Carbide Control Plan. Read what it has done for them and what it can do for you.

COORDINATION of all phases of carbide tool use within the plant, under the direction of a carbide supervisor, is helping New Britain-Gridley lower its break-even point, a factor of concern to all manufacturers.

Under this unique coordinated carbide control plan, the design, maintenance and application of carbide tools are standardized wherever possible. This standardization, applying to about 95% of all single-point machining operations at New Britain-Gridley, speeds up application of tools on the job, keeps engineering costs at a minimum and simplifies the purchase of cutting tools on an economical, scheduled basis.

Why not investigate and find out how "Triple C" can fit into your production operations . . bringing you amazing savings in time and costs while increasing your production and profits?



"Triple C" tool standardization allowed over 95% of New Britain-Gridley's turning, boring and facing work to be done by only twenty-nine standard carbide-tipped tools, some of which are shown here.

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Working Conditions

Few other machine shops provide the pleasant and work-conducive atmosphere of the Gulf laboratory shop. Sound-proofing of welding, grinding, and sheet-metal operations has reduced noise. Blasts of hot air during the winter season have been eliminated by means of monitor heating and wall radiators, with vents directed to the ceiling.

Ideal daylight is provided by windows rising from bench level to ceiling on main floor and the entire height of the monitor section. To avoid sun glare and summer heat, all work benches have been placed on the shady side of the structure. Any artificial illumination that is required is provided by fluorescent lights.

The interior side walls are painted with two shades of green, while the end walls are of yellow. All hazards, including the overhead crane, are bright yellow. Lathes and other machines have been painted horizon gray or spotlight buff, and most face the same direction to facilitate supervision and enhance orderliness.

Hard Facing Wire. A seven-page booklet containing up-to-date information on Colmonoy Spraweld Wire, a hard facing wire for executing the Colmonoy Sprayweld Process in which welding and matallizing procedures are combined, has been published by the Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. Included are data on application, surface preparation, spraying and fusing, cooling and finishing, and so on. Copy free.

Ductility Testing Machines, including hand-operated, motor-driven, automatic, and dynamic types, are shown and described in a 12-page two-color bulletin (No. 39) issued by the Tinius Olsen Testing Machine Co., Easton Rd., Willow Grove, Pa. Tools for universal testing machines are also shown and described, and instructions for the installation, operation, care and maintenance of ductility testing machines, as well as testing suggestions, are included. Copy free.

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Besly is proud to announce as additions to its line of precision cutting tools these new high speed drills and reamers—available in a complete range of types and sizes.

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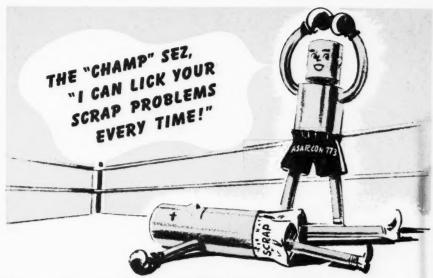
Degrees, minutes and seconds in any combination are at your fingertips with a positiveness and speed that has never before been equalled.

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- Screw Machine Tolerances and Lengths.
- \$ Minimum Finish Allow-



More than 200 standard sizes in solids and tubes from $\frac{1}{2}$ " to $4\frac{3}{4}$ " OD stocked by distributors in lengths to $104\frac{7}{8}$ "

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The NORTON Wheel The Unit that Insures

RUGGED — For Heavy Stock Removal

PRECISE — For Close Tolerances and Fine Finish THE grinding wheel spindle unit is the heart of a precision grinder. On its qualities depends the ability of the grinder to give ENDURING PRECISION.

The Norton Wheel Spindle Unit is the heart of Norton Cylindrical Grinders from 4" to 36" swing capacity. It has time-proved its ability to deliver ENDURING PRECISION in thousands of plants throughout the world.

Improved and refined in the new Type CTU and other Norton Grinders, this famous Norton "Heart" provides the ruggedness for heavy stock removal, and the precision for finest finishes and closest tolerances.

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to enable you to meet today's—and tomorrow's
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DESIGN HIGHLIGHTS

- In the Norton Wheel Spindle Unit design, a ruggedly proportioned spindle of toughened, wear-resistant steel runs on a film of filtered lubricant in long, heavy, hard-bronze bearings. These bearings provide support over practically the entire circumference of the spindle.
- This Norton unit offers extreme resistance to wheel pressures, belt pulls, and to those other factors that tend to reduce precision and shorten life.
- Long and continuous bearings surfaces confer extreme rigidity and insure low unit pressure. This low unit pressure helps to maintain adequate lubrication and sustains efficiency.
- This heavy duty bearing design, plus precision bored casings, assures permanent alignment between wheel spindle and work center-lines.

FEATURES OF THE NORTON WHEEL SPINDLE UNIT

- Over 50% of spindle body supported in two super-duty size, hard bronze bearings.
- The Norton spindle stays on its fixed center-line—no shifting is possible.
- Spindle is rigidly supported over practically its entire circumference.
- Bearing length over twice the diameter—a very desirable feature.
- Bearings automatically flooded by filtered lubricant.
- Heavy-duty and thrust bearing at center of spindle is flood lubricated.
- Self-contained lubricating unit within wheel spindle housing delivers film of filtered lubricant between spindle and bearings.
- Automatic lubricant flow clearly visible through bull's-eyes—an important safety feature.
- Extremely low unit pressure due to long and continuous bearing surfaces.
- Wheel speed changes possible without readjustment of bearings.
- Ruggedly proportioned spindle is toughened to resist wear.
- An unmatched service record many thousands in use. Less than 1% replacement bearings sold.

Continued research has not yet produced a better or more reliable spindle unit



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standard cutting too. Of rigid and simestandard cutting too. Of rigid and simestandard cutting some saving faretures,
with its construction, with its indestructible
if has long been outstanding in illustraindustry. There's a reason: Note in illustraindustry. There's a reason: Note indestructible
industry. There's a reason: Note indestructible
industry. There's a reason: Note indestructible
industry. There's a reason: Note industry industry.

It is composed of two with two of the
formed on the cutter shank, with two of the
formed on the cutter shank, inside above
formed on the cutter shank; inside above
formed on the cutter shank; inside above
holder. There is an aligning that brings the
holder than the cutter that the cutter than the cutter that the cutter than the cut

and below the driving lugs that brings and prevents and below the driving lugs that brings and prevents and bolow the cutter from being the cutter are engaged the cutter and holder are equipment. The cutter and tisengaged by hand. No drift pie required and disengaged by hand. No drift pie required ment are necessary.

Continental holders and cutters are available individually or in standard tool room sets. Send for Catalog No. D27161.

49-31



CONTINENTAL TOOL WORKS

DIVISION OF EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN



SEE THESE CIRCLE (R) REPRESENTATIVES:

STATE OF ARIZONA

John Di Eugenio 733 W. Lincoln Street, Phoenix

LOWER CALIFORNIA

Circular Tool Supply Co. 2816 S. Santa Fe Ave., Los Angeles

STATE OF ILLINOIS

Donald Robertson & Co. 549 W. Randolph Street, Chicago

STATE OF INDIANA

Walter F. Greene Associates 3201 N. Illinois Street, Indianapolis

NEW ENGLAND STATES

F. J. McMillen 765 Allens Ave., Providence, R. I.

STATE OF MICHIGAN Andrew Spruce

2411 14th Street, Detroit STATE OF MINNESOTA

Walter R. Hammond Co. 1419 Wash'gt'n Ave., So., Minneapolis

STATE OF MISSOURI

B. C. MacDonald & Co. 1592 Arcade Bldg., St. Louis SOUTHERN NEW JERSEY

EASTERN PENNSYLVANIA

General Tool Sales Co. 3945 No. Broad Street, Philadelphia NEW YORK CITY

METROPOLITAN AREA F. A Brady, Inc. 30 Church Street, N. Y. C.

NORTHEASTERN OHIO Production Tool Co. 2479 Lee Blvd., Cleveland

UPPER NEW YORK STATE
James O. Horne 528 Powers Building, Rochester

NORTHWESTERN OHIO Peerless Tool Service, Inc. 3628 Detroit Avenue, Toledo

SOUTHERN OHIO Robert W. Gloyd

1217 E. 3rd Street, Dayton WESTERN PENNSYLVANIA

Voss Machinery Co. 1800 Sarah Street, Pittsburgh STATE OF WISCONSIN

Wisconsin Tool & Machine Co. 8829 West North Avenue, Milwaukee

EXPORT DEPARTMENT

21 State Street, New York 4, N. Y.

Why good business? Simply because these men represent the most reliable name in circular metal cutting tools . . . Circle R!

CIRCULAR TOO PROVIDENCE 5, RHODE ISLAND



Sales Hints for the Smaller Shop, Part II

Karl F. Kirchhofer

Methods of Marketing-Preparation of Publicity

By KARL F. KIRCHHOFER

THE problem of distribution is one that often plagues the small manufacturer. If he manufactures a tool or a piece of equipment that is used in the metal-working industries, for example, the question arises of how to market his product, once he has developed it. Should he endeavor to sell it direct, using direct mail? Should he hire a salesman to call on all the likely prospects? Should he attempt to sell through jobbers, dealers, specialty salesmen, manufacturers agents? Obviously it is impossible to answer with a single answer all the questions that arise.

However, there is much to be learned in a study of case histories and we shall quote a few. Some years ago an accessory for surface grinders was being manufactured by a man in the Middle West. It was his practice to make up a couple dozen sets, then peddle them from shop to shop in the thriving industrial city where he was located. By means of this method of distribution, he was barely able to make a living. A national sales organization with related lines heard of this lone man and offered him an order for 500 sets if he would make them exclusively under their trade name. He protested, "But that's a year's work for

me." They suggested that he purchase more equipment, hire and train a couple of men to work for him.

Today, six years later, he is still manufacturing his specialty item. His product has been dovetailed into the 30 or more other lines handled by the sales organization and his selling and distribution problem has been solved. Alone, he might still be struggling along on a hand to mouth basis, since he could never have afforded the national advertising, nor could he have built up the sales force that would have been required to launch his product successfully. Therefore, he benefited from the prestige afforded by association with a well-known sales company and their endorsement of his product.

In another instance, a small manufacturer of a specialty item—an indicator—decided that it would be folly to attempt to market his indicator direct to the consumer when he could sell it through mill supply houses, backing his dealers with advertising in the metal-working trade papers. In his advertising he directs readers to the mill supply houses where they will find his indicator in stock. He has adopted a dealer policy and has the backing of his dealers because they



DELTA Dual Weld COMBINATION

With this single machine, you can spot weld, arc weld, braze, and solder! You can work on fine wire without burning or overheating on the wire without burning or overheating—and spot weld up to 16-gauge steel on a production basis. You can change from one operation to another in a hurry.

This double-purpose unit costs much less than an individual 5 KVA spot welder and 120-ampere arc welder! That's due to Delta's

unique design, careful engineering, and high-

production methods.

In industry everywhere, low-cost Delta Milwaukee Machine Tools have long been recognized as the finest machines available. Now you can enjoy the same high Delta quality in welders.

Have your nearby Delta distributor show you this new Delta Combination Welder. Get a better idea of the many ways that you can use it profitably. Also see the new Delta 5kV A Spot Welder and Delta 120-ampere Portable Arc Welder. And ask about buying on easy, convenient time payments.

Send coupon for descriptive bulletin AD-453.



Look for the name of your Delta distributor under "Tools" in the classified section of your telephone directory.



POWER TOOL DIVISION Rockwell Manufacturing Co. Milwaukee 1, Wisconsin

No Other Welder Like It!

LOOK AT THESE FEATURES:

- · One-piece Welding Horns
- Calibrated Current Scale
- . Simple Contactor
- . 10" Throat Depth
- . Wound Transformer Core
- · Double-Insulated Coil
- · Full Spot Weld Pressure Adjustment.

Power Tool Division, Rockwell Mfg. Co. 602K E. Vienna Ave., Milwaukee 1, Wis.

Send me free bulletin AD-453 describing the new Delta welders,

Company

----- (----) State____

know he sells only through them and not direct.

That's another factor to remember. If you decide that you are going to sell only through dealers, don't deviate from that policy. Working under this policy, the manufacturer turns over to the dealer in that territory any orders that come in direct to the factory. Dealers appreciate this consideration, and are more apt to push his products than those of a competitor who takes orders direct from consumers.

Many small manufacturers do not take advantage of their free publicity opportunities. If you manufacture a special tool or machine tool accessory, you may receive valuable publicity in the new product sections of the metalworking press, provided that you are writing about a new development or an improvement on your present tool. This practice is fundamental in metalworking publicity, and is not new. Lists of publications that serve your field

are available. Every time you bring out a new tool, immediately have it photographed, write a release pointing out its features and forward it to the papers in your field. Do not, however, expect that every news release you send to the editor will be accepted for publication. Some editors receive a lot of material that they cannot use for reasons of space and also because they may not have time to rewrite your release and put it in the proper editorial style. Therefore, unless you are an experienced writer, find an industrial publicity man who'll turn out your release for a nominal fee. When a news release is properly written the chances of having it published are greatly increased.

Good publicity is always valuable and there are many opportunities for publicity besides the announcement of a new product. If you live in a small city or town, send a few lines to your local newspaper whenever you buy a



STACKBINS IN STACKRACKS

REDUCE HANDLING of Tools, Parts and Materials



STACKBINS are individual hopper-fronted stacking bins, designed for storage, transportation and assembly of tools, parts and materials.



STACKRACKS are individual units which lock together to form racks of any size, shape or capacity. Stackbins slide like drawers in Stackracks.

Because Stackbins are portable containers—not fixtures—tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed without disturbing any other bin.

Manufactured and sold in Canada exclusively by Wickware-Stackbin, Ltd., Ottawa Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN
"Stacked and



SYSTEM

Still Accessible



Our production facilities are employed exclusively in the design and fabrication of standard and special steel and semi-steel die sets. "DETROIT" specialization guarantees dependable, prompt service and workmanship of the highest quality on both standard and special jobs. "DETROIT" die sets are Micro-metric machined to assure long die life and consistently satisfactory operation.

CALL "DETROIT"

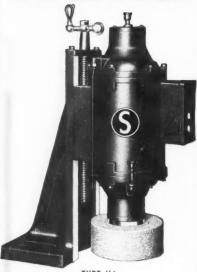
DETROIT .		. TR 2-5150	
BUFFALO .		. PA 9206	
CLEVELAND		. GA 3310	
DAYTON .		. HE 3042	
INDIANAPOLIS		. HU 5604	
LOS ANGELES		. AD 7251	
MILWAUKEE		ED 2-2359	
MINNEAPOLIS		. AT 5264	
PHILADELPHIA		. VI 4-4084	
PITTSBURGH		. GR 1362	
ROCK ISLAND,	ILL.	. RI 743	
ST. LOUIS .		. FR 6811	
SAN FRANCISC	0	EX 2-7018	
TOLEDO .		GA 5706	
WINDSOR, CAL		. 3-9086	

DETROIT DIE SET CORPORATION

2895 W. GRAND BLVD. . DETROIT 2, MICHIGAN

DETROIT NE SETS *

ANGLE PLATE DIE GRINDER



TYPE VA

2 H. P. AND 3 H. P.

PROMPT DELIVERY

Here's the handy tool for grinding cutting dies, shear blades, paper knives, etc.

Vertical hand adjustment of 10" is standard. Also available with horizontal feed.

Equipped with Push Button Safety Starter having overload protection.

NEW FEATURE:

Set screw for externally taking up wear on bearings without removing wheel, bearing seal, etc. No shims involved.

Visit our Booth 1628 at the National Metal Exposition, Cleveland, Ohio, OCTOBER 17-21.

Write for Catalog 44

THE STANDARD ELECTRICAL TOOL CO.

2487 RIVER ROAD CINCINNATI 4, OHIO

new piece of equipment. "Brown's Machine Shop Adds New Universal Grinder," might well be your headline, and then, you might go on to explain how the addition of this equipment enables your plant to handle more diversified types of work.

When you have a shop picnic write a story about it and send it to your local paper. The main idea is to keep the name of your shop before the pub-

lic as much as possible.

The idea still prevails in the minds of many small manufacturers that advertising doesn't pay. This has been disproved so many times that it hardly seems worthwhile to mention it, but the other day I visited a plant employing about 30 people which makes, in addition to other products, presses for printing on cellophane and other wrapping material. As a result of an advertising campaign in a trade journal costing a few hundred dollars, this shop sold seven of these presses at a price of \$15,000 each. That's just another bit of evidence in the long list available to prove that advertising pays and pays well.

Precision Boring Machine. The New Britain-Gridley Machine Division, The New Britain Machine Co., New Britain, Conn., has issued an eight-page illustrated catalog explaining its new precision boring machine which is built in two models, one for straight boring and turning and the other with an additional slide for contour work as well. Copy free.

Countersinks. Bulletin 17-ES issued by Severance Tool Industries Inc., 724 Iowa St., Saginaw, Mich., contains detailed dimensions, prices, and other data on Severance "Chatter-Free" Econo-Sinks for fast, clean cuts on a wide range of materials. Copy free upon request.

"Safety on All Sides" is the title of a four-page bulletin prepared by the D & M Guard Co., 820 Revere Ave., North Tonawanda, N. Y., illustrating and describing automatic punch press guards. Copy free upon request.



PUNCHES and DIES

Click!





AND JUST EASY TO REMOVE

A push and a twist on any B interchangeable punch or die and it's

securely locked, both vertically and radially. This easy installation and easy removal feature cuts press "down-time" for punch or die replacement to a minimum. No disassembly of the die is necessary.

punches and dies save time and money in die building, too, because they are easily and accurately assembled in die construction. They are completely interchangeable; selected steels with con-

trolled hardness are finished to very close tolerances to insure uniformity.

standard punches and dies are stocked for immediate delivery. Punches and dies of special sizes, shapes and materials are made promptly to your specifications. GET THE WHOLE STORY
IN THIS FREE
CATALOG

A 48 page book containing full information on Allied's "one stop service." Write for your copy.





ALLIED PRODUCTS CORPORATION

Department 35 • 4624 Lawton Ave. • Detroit 8, Michigan

Finding a Future in Fisher Body

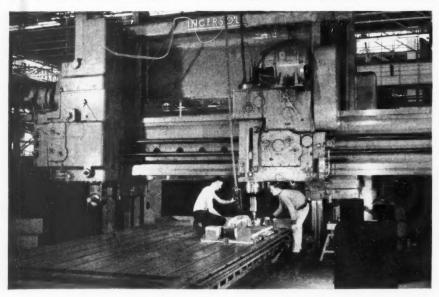
A thoroughly planned apprentice training program equips young men for automobile body building jobs.

IN order to furnish a continual supply of trained employes skilled in the trades relating to automobile body building, Fisher Body Division has adopted an apprentice training program which offers the 18-to-21-year-old beginner in industry unexcelled opportunities for a career.

Fisher has sponsored apprentice-

ships for many years not only to provide craftsmen but also with a view to developing men who have the ability and desire to move ahead. Approximately 418 apprentices now are going through three or four-year Fisher apprentice training courses and when they have finished they will receive a Certificate of Completion of Appren-

Dwarfed by a huge planer-type milling machine, a journeyman and an apprentice work together at the Fisher Body stamping plant at Hamilton, Ohio. At the left is journeyman Louis Darovec who is teaching Thomas N. Tegge, a tool and die apprentice, the operation of the machine.



Lecturing tool and die apprentices on die construction at the Fisher Body plant at Pontiac is Fred Tauffenbach, general foreman of the tool and die section there.

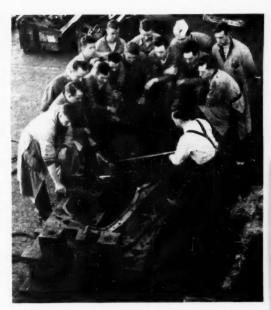
ticeship. The certificate entitles the graduate to be rated a journeyman and to assume responsibilities every bit as important as others in the famous Fisher team.

The opportunities for these young men who want to be the masters of their hands as well as their heads cover trades such as tool and die design, machine repair, electrical, to mention a few. In addition to practical on-the-job training, the apprentice is required to study related subjects in the public schools.

Such related training might be drafting, shop arithmetic, basic metallurgy, or a score of other subjects, which usually are acquired at a vocational school concurrently with the work, to provide a well-rounded background for the trade. It is this training in related subjects that makes modern apprenticeship quite different from the older forms of trade learning that taught only manual proficiency in a single task.

Fisher Body has long studied apprentice training methods and as early as 1936 adopted the related training program. In Fisher Body, the machinist trade has the greatest demand for apprentices, for Fisher makes a great number of the tools and dies needed for its Herculean job of body building for all General Motors cars. A total of 242 apprentices are now learning to be machinists, mastering tool and die making, and body die making.

In any branch of the trade the machinist must be able to operate and care for all the standard machine tools.



He works from blueprints and should be able to make sketches and write bills of materials. He must know simple algebra, geometry and elementary physics. He must be acquainted with all types of steel and some of the other metals and he should be able to select the proper tools for each operation.

Sometimes the machinist works entirely on the various machines of the trade. However, in some instances he orders the materials, performs the bench layout of the several parts, and then carries the project on through to completion.

After a brief introductory period the apprentice machinist starts learning to set up and operate the standard machine tools. He works on the drill press, lathe, milling machine, shaper, the several kinds of grinders, and on boring mill and planer in shops where these tools are used. Instruction in machine operation comprises the major part of the training and includes instruction and practice in the use of fine measuring instruments. He spends



For 48 years a journeyman in Tool and Die work, Thomas Ward, left, helps Donald J. Mason learn to read a die blueprint. Macon is halfway through his four-year apprenticeship. Both men are employed at Fisher Body Die and Machine Plant at Detroit.

some time in heat treat and considerable time on bench work involving the use of hand tools in fitting, assembly and layout work.

The related school subjects for the apprentice machinist will cover metallurgy of iron and steel, heat treatment

of steel, drafting fundamentals, blueprint reading, die design, computation of mechanisms and shop trigonometry.

Another principal trade group in the Fisher apprentice training program is the maintenance trades, which include millwrights, machine repairmen, electricians, welding equipment repairmen, pipefitters and sheet metal workers. In addition, but by no means of less importance, is jig and fixture building, pattern making, model making, tool designing and engineering wood and metal working. The first group requires three years of training while the latter group, and the machinist trade, requires four.

HEY DO DOUBLE DUTY

CHALLENGE DUPLEX Semi-Steel BENCH BLOCKS

With working surfaces both top and bottom these DUPLEX BENCH BLOCKS serve as ready-built bases for small fixtures and tools.

Made in three combinations—

1. Smooth on both sides.

2. Both sides grooved for lapping -1g-inch mesh.

PRECISION

 One surface smooth and the other grooved with ¹/₂-inch mesh for lapping metal tometal joints.

CHALLENGE DUPLEX BENCH BLOCKS are made of special analysis semi-steel with internal ribbing designed to insure them adequate strength. One standard size $10x14x2^1$ x-inches.

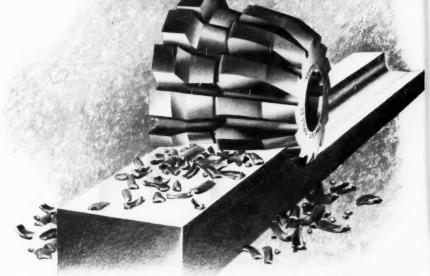
Hand-scraped at extra cost.

THE CHALLENGE MACHINERY CO.

"Over Fifty Years of Precision Equipment Manufacture"

Main Office and Factory - GRAND HAVEN, MICHIGAN

no other formed cutter will outperform



contact your local distributor

His name is listed in Union's THOMAS' REGISTER insert under the heading "Drills, Twist".

UNION TWIST DRILL COMPANY, ATHOL, MASSACHUSETTS

MILLING CUTTERS - GEAR CUTTERS - TWIST DPILLS - HOBS - REAMERS - CARBIDE TOOLS

We own and operate S. W. CARD MANUFACTURING CO. Division, Most, Flags, Dies, Screw Plates,

BUTTERFIELD DIVISION, Derby Line, Vr., Tops, Dies, Screw Plates, Reamers,

BUTTERFIELD DIVISION, Rock Island, Que., Milling Cutters, Twist Drills, Hobs, Reamers, Taps, Dies, Screw Plates.



An applicant for apprentice training must meet certain requirements. He must be between 18 and 21 years old; must pass a physical examination, and should have a high school education with a satisfactory record. He also should be mechanically inclined and demonstrate a definite interest in the Leo E. Whitney (left), a journeyman in welder repair at the Fisher Body Plant No. 1, Flint, Mich., instructs two new apprentices in the repair of a timer for a welder. The apprentices, who have only several months in on a three-year course, are Donald J. Wheeler, left, and Walter J. Strudgeon.

trade of his choice.

While he is on the job, the apprentice is under the guidance of the foreman of the department in which he is working. To assure his protege's progress, the foreman rotates him from job

to job to learn each step in the trade. The apprentice also may be given access to trade periodicals, material catalogues and other publications to round out his general knowledge.

The four-year apprentice course requires a total of 7,280 hours, while the three-year program calls for 5,460

SELECT THE BEST ... **Balancing Tool for Your Work** from Sundstrand's Complete Line

Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart at right.



ADDITIONAL DATA

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin No. 588.



CAPACITIES

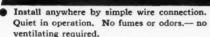
Swing	Between Standards	Weight Capacity		
21 in.	20 in.	12 lbs.		
21 in.	20 in.	800 lbs.		
43 in.	29 in.	800 lbs.		
43 in.	29 in.	2,000 lbs.		
6 ft.	5 ft.	5,000 lbs.		
8 ft.	8 ft.	10,000 lbs.		
Any	Any	24,000 lbs.		
43 in.	30 in.	800 lbs.		

SUNDSTRAND

MACHINE TOOL COMPANY 2539 Eleventh St. Rockford, Ill., U.S.A

HEAT TREAT SMALL PARTS, TOOLS & DIES

In Your Own Plant



 Any intelligent man can operate furnace with automatic temperature control, using established procedures.

Operating cost under 4c per hour to hold 1600°
 F. in Model 3 furnaces, with 2c per kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and temper small parts in your own plant... without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

PRODUCTION HEAT TREATING of small parts... Small batches... Running pilot lots to predetermine mass production techniques... Emergency repairs... Industrial and laboratory testing... Miscellaneous controlled heating jobs.



CHAMBER	8°W 6°H 14°L 1850° F.			10'W 6"H 18"L 1850° F			8"W 6"H 14"L 2000° F.		10°W 6	'H 14'L		
MAX. TEMP.									900° F.	1200° F.		
AMPERES 14.8 at 230 v.		19.6 at 230 v.			20.2 at 230 v.		17.5 at 230 v.	17.5 at 230 v.				
WATTS	3400			4500			4650		900 Max.	1200 Max.		
MODEL*	M H-3	V H-3	M K-3	V K-3	M H-4	V H-4	M K-4	V K-4	V K-5	V K-6	ACL	ACH
PRICE	200.00	230 00	250.00	280 00	295.00	325.00	345.00	375.00	420.00	340.00	385.00	410.00

* M models complete with hinged door and hearth plate. V models have counterweighted vertical lift door, K and AC (air circulating with built-in fan) models include Selective Power Modifier for input control to correct temperature lag.

NEW INDUSTRIAL BOX FURNACES — New Cooley door design insulates front section and reduces thermal losses to give greatly improved operating performance. Available in 3 sizes, 12 W x 8 H x 18 T, 24 T, 36 L. Maximum temperature, 1850° F. Also pot furnaces for hardening and tempering to 1650° F. Write for New Furnace Data plus Simplified Heat Treating Instructions.



COOLEY

ELECTRIC MANUFACTURING CORP.

"LEADERS IN SMALL ELECTRIC FURNACE MANUFACTURE"

MH-3-A VH-3-A











M H-3-4 V H-3-4 MK-3-4 V K-5 V K-6 AC-L-H BL 1,2,3 Indianapolis Machinery Export Corporation, Export Manager, 44 Whitehall Street, New York, New York





layers containing a total of 20 diamonds. Multiplicity of cutting points; depending on diameter of wheel, four or more diamonds will always contact the wheel, giving finer dressing and pre-cision finish. Recommended in all straightfaced dressing and truing on wide-faced, hard silicon carbide wheels. Used most effectively on Norton Cylindrical, Landis Cylindrical, Cincinnati Cylindrical Grinder and (with special Adapter) on Cincinnati Centerless Grinder.

Requires fewer passes across the wheel. Generally used with fast dressing traverse.



31 W. 47th St., New York 19, N. Y.

Representatives:

Buffalo - Schoenborn Abrasive Sales Co.,

Chicago-J. R. Mendelssohn, 4744 Wood-lawn Ave. Cleveland-John P. Roberts, 15820 Grovewood Ave

South Bend-Formrite Tool Co., 1311 W. Indiana Ave. Philadelphia-Jack K. Smith, 1200 Commer-

cial Trust Bldg.



Moline — L. R. Christiansen Co., 617 15th Street. Milwaukee — Redi Products Co., 211 South 2nd St.

"There is no economic substitute for diamonds." hours. The apprentice receives a wage increase after each 910-hour period of plant experience if his work is satisfactory. The related training usually is done in public trade schools. The student is required to spend a minimum of 144 hours a year, or a total of 576 hours in a 4-year period. In addition, weekly shop meetings during work hours add 50 hours per year to this schooling. In these meetings company and shop procedures and policies, industrial safety, shop conduct, plant organization and similar subjects are discussed.

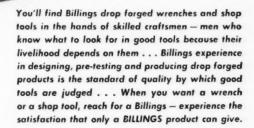
Complete records are maintained on all phases of the young man's training. Shop foremen and instructors review his progress periodically in such matters as learning capacity, skill, job adjustment, personal characteristics and initiative. A training coordinator checks these appraisals carefully and discusses them with the apprentice when it is advisable.

Upon graduation the apprentice is eligible to take his rank as a journeyman, with the minimum wage rate of the classification he enters. Figure adjustments in his pay are made commensurate with his progress as judged by his supervisor.

Going up on "the ladder" to positions of greater responsibility in plant management is not unusual in Fisher Body for men who have started their careers as apprentices and have the ability and desire to move ahead. Fisher made a survey in 1944 of the whereabouts of its apprentice training program graduates and found that about 10 per cent of them had moved on to the supervisory level of management. Apprentice training is an excellent start toward any goal in industry.

16-Inch Swing Precision Lathe, product of the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind., is illustrated and described in a four-page two-color bulletin (No. 316) distributed by this firm. Copy free,







CARBON STEEL WRENCHES

in all standard styles and openings. Complete line of Billings tools with tradition featured in the new Billings General Catalog No. 49.



WRENCHES & SHOP TOOLS

FROM BILLINGS INDUSTRIAL SUPPLY DISTRIBUTORS

THE BILLINGS & SPENCER COMPANY HARTIORD I, CONNECTICUT, U.S.A.



Take this PUNCH for example...

WE STOCK IT IN 29 PUNCHING DIAMETERS

and as this is but one of our twenty-one standards you can imagine the enormous quantity of Punches carried in stock to meet immediate demands. Besides, for each standard Punch there is a standard Die, consequently our stock of Dies is as varied as our stock of Punches.













WE MAKE PUNCHES AND DIES FOR ALL THE SHAPES SHOWN

Write for SMALL TOOL HAND BOOK

PUNCHING TOOLS & DIES

NEW YORK ... CHICAGO DETROIT ... PHILADELPHIA PITTSBURGH CLEVELAND
PUNCH & SHEAR WORKS CO.

Established 1886

· · · · · POWER PRESSES · · · · ·

FABRICATING TOOLS

CLEVELAND 14, OHIO

NEVER BEFORE

A SURFACE GRINDER LIKE THIS

The most important
Surface Grinder
development in years!
LEACH 6X12
SURFACE GRINDER

ONLY

\$48500

COMPLETE WITH MOTOR

F. O. B. PROVIDENCE, R. I., U. S. A.

Look at that low price, then consider these facts carefully:
The Leach 6 x 12 Surface Grinder actually handles 90%
— yes, 90% — of the work of larger, far more expensive machines. It's a completely self-contained unit with a 2-speed ball bearing spindle, driven by a ¾ HP motor. It's accurate, time-saving, vibrationless, and proved to the hilt by hundreds of enthusiastic owners. Write to us for detailed description.



H. LEACH MACHINERY CO.

387 CHARLES STREET
WORLD DISTRIBUTORS

PROVIDENCE 4, R. I., U. S. A.

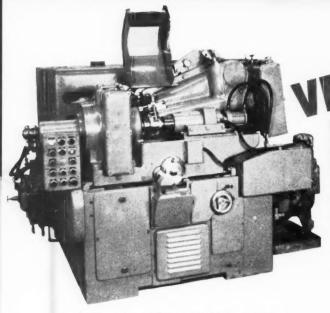


Fig. 1-Front view of Fellows No. 12 Gear Finisher.

N MANY occasions in the past a number of machine tool builders in a given locality have pooled their efforts in order to present their newest developments in the field, but it remained for four Vermont manufacturers of machine tools to stage, during the week of June 20, one of the most successful exhibits of this type. With their manufacturing establishments located within a radius of 17 miles, Bryant Chucking Grinder Company, Fellows Gear Shaper Company, and Jones and Lamson Machine Company, of Springfield, and Cone Automatic Machine Company, Inc., of Windsor, Vermont, worked closely together on the "in-plant" exhibition and demonstration which was attended by more than 500 industrialists.

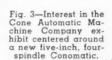


Fig 2—View of The Fellows Gear Shaper Company exhibit,

BUILDERS PRESENT

Among the 18 machines exhibited in the Fellows Gear Shaper plant was a new gear finisher, the construction and operation of which represent a revolutionary development in the art of finishing gears. This machine, shown in Figs. 1 and 2, operates on a principle in which the cutter is set at an angle relative to the work. The cutters are provided with teeth of helicoidal shape, and are sharpened by face grinding in a manner similar to that employed in the sharpening of spur gear shaper cutters. The cutter finishes both sides of the teeth in one traverse and, while it is possible to remove considerably more stock from the sides of the teeth than with conventional shaving methods, cutter life is prolonged by keeping the amount of stock to be removed to a minimum.

The machine is designed so that air operated work-holding fixtures can be applied for clamping



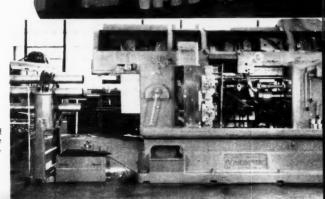


Fig. 4—Front view of five-inch, four-spindle Conomatic Model KL.

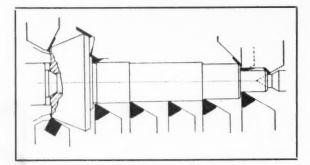


Fig. 5 - A new 16-inch Fay automatic lathe has been developed for turning forged driving pinions as shown in this sketch.

and unclamping the work, and it is also provided with a tailstock for supporting stem pinions. The operation of the machine stops when the cutter completes the traverse of the work, the cutter remaining in contact with the work. The maximum capacities of the machine are as follows: Pitch diameter of the work, 12 inches; outside diameter of the work, 121/2 inches; diametrical pitch, 5; outside diameter of cutter, 71/4 inches; face width, 834 inches; and helix angle, 45 degrees. The overall length of the machine is

7½ feet; overall depth, 6 feet, 1 inch; and the height, 5 feet, 3 inches.

Cone Automatic Machine Company exhibit was composed entirely of fully automatic bar machines of one, four, and six work spindles. The machines on exhibit indicated the trend toward low-cost tooling and quick changeover facilities and served to illustrate the overall machining facilities of the Conomatic line, namely the handling of



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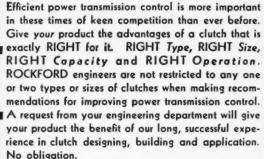




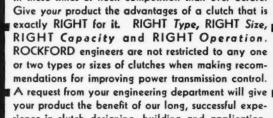




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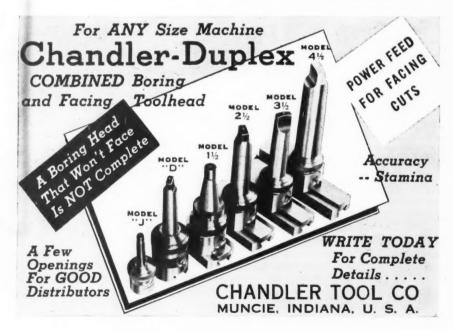
Fig. 6—Ground connecting rods were carefully examined by those who visited the Bryant Chucking Grinder Company exhibit.

short, medium, or

long. The work spindle speed range of this machine is from 56 to 435 r.p.m., with 30 speeds avails of pick-off change end slide is of cy-

work from $\frac{3}{16}$ inch to 5 inches in diameter and from $\frac{1}{16}$ inch to 17 inches in length. Highlighting the Cone Automatic exhibit was the five-inch, fourspindle Conomatic Model KL shown in Figs. 3 and 4. Built for the Cleco Division of the Reed Roller Bit Company, Houston, this machine is designed to profitably handle runs of any size—

able from 19 pairs of pick-off change gears. The main end slide is of cylindrical design to provide for accurate alignment. This design offers four full end-working positions for any type of end-working tool and includes sufficient swing capacity to accommodate any standard make die head for threading to a full five-inch capacity.





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A length of stock feed mechanism for feeding up to a maximum of 10 inches is provided as standard equipment.

More extensive use of carbide tooling was predicted by Jones & Lamson whose exhibit featured eight items of equipment. Outstanding among the new machines was a new 16-inch Fay automatic lathe designed for turning forged driving pinions, as shown in the sketch Fig. 5, in a single operation at speeds as high as 1185 f.p.m., with floor-to-floor time being 17 seconds. The spindle speed of this lathe is 1200 r.p.m. Also shown was an automatic multi-rib thread and form grinding machine designed for grinding 34-16 NF threads on axle drive pinions from the solid. With this type grinder, it is possible to grind threads up to two inches in length.

In the accompanying illustration Fig. 6 may be seen a new grinder designed for grinding the large bore of connecting rods which was exhibited by Bryant Chucking Grinder Company. Also on exhibit was an automatic grinder having a spindle speed of 90,000 r.p.m. for grinding 7-millimeter bores in fuel injection nozzles. Four additional grinders plus the complete line of Bryant gages completed

the Bryant exhibit.

Improved Universal Pneumatic Die Cushion, available in a wide variety of models and sizes for deep drawing operations, pressure pad control on form dies, stripping blanks and ejecting slugs, and so on, is the subject of a four-page twocolor illustrated bulletin available from the Dayton Rogers Mfg. Co., 2824 13th Ave., S., Minneapolis 7, Minnesota. Copy free upon request.

Magnetic Clamping Device, consisting of a pair of magnetically actuated clamps so designed that parts of non-magnetic material may be located between the jaws and held firmly against the face of a magnetic chuck for machining pur-poses, is illustrated and explained in detail in a two-color bulletin (V9-1) distributed by the Hanchett Magna-Lock Corp., Big Rapids, Michigan. Copy free.

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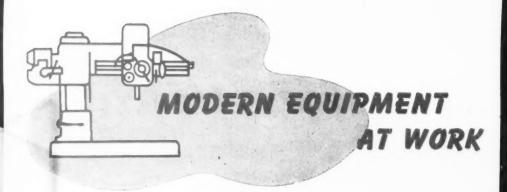


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Machining 22-Ton Diesel Crankshaft Sections

LARGE Mackintosh-Hemphill engine lathe is shown in the accompanying illustration being used at the Nordberg Mfg. Co. plant, Milwaukee, to machine one-half of a crankshaft for a giant ten-cylinder diesel engine. The five throw crankshaft section is machined from a single forging approximately 231/2 feet in length and weighing about 22 tons. The lathe, which measures 84 inches by 50 feet, is being used for turning the journal bearings and crankshaft cheeks. Lathe carriages are fed longtitudinally by means of a heavy feed screw mounted on the bed between the front and middle ways, and the carriage cross feed is obtained from a lead screw mounted on the front of the bed. A 75 h.p motor is used to drive the headstock. The lathe was manufactured by the Mackintosh-Hemphill Co., Pittsburgh and Midland, Pennsylvania.

Sheffield Precisionaire for Gaging Cylinder Block Bores

A SPECIAL Precisionaire gaging machine for inspecting the bores of eight cylinder motor blocks has been developed by The Sheffield Corp., Dayton, Ohio, for a large automobile manufacturer. Each of the bores is

checked automatically at four different points, and the bore classification is then stamped on the



Journal bearings and crankshaft cheeks of a giant five throw crankshaft section are shown being machined.

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block manually by the operator.

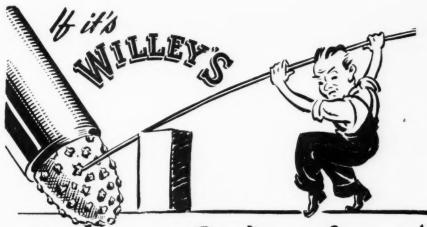
The gaging machine is located along the line of a roller conveyor, and each cylinder block is rolled directly from the conveyor into position on a turntable in the machine. The block is then located in the proper locating position by hydraulically actuated shot pins, and the operation of inspecting four bores along one side of the block is started by pressing an electrical



Sheffield gaging machine designed for checking bores in cylinder blocks.

"Down" button. Four gaging spindles are automatically lowered into the four bores, and four sets of air jets for each gaging spindle are used to check the bores.

The positions of arrow floats in 16 glass tubes (four for each bore) indicate whether or not the bores are within specified tolerance limits for taper and diameter. By turning a handle directly under the glass tubes, the spindles are rotated 180 deg.; and a full



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W-4	11/32	5/16 3/8	13.00	12.00	11.00	10.00	12 to 20
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W-6	7/16	7/16	17.00	16.00	15.00	14.00	24 to 42

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360 deg. out-of-round check is obtained. The classification of each bore is then stamped on the block by the operator, as shown in the accompanying illustration; and this classification information is used in selecting pistons to be assembled in the block.

The gaging spindles are then retracted; the turntable is rotated 180 deg., and a similar procedure is followed to inspect the opposite bank of four cylinder bores. After all cylinder bores have been checked, the shot pins which lock the block in position are released; and the block is pushed onto the conveyor line by the next block to be gaged.

Should any spindle fail to enter a bore, the downward travel of the spindle is stopped instantly, and the place of interference is indicated by a signal. This safety feature prevents damage to the spindles as well as to the cylinder blocks. Since the installation of

this machine, inspection costs have been reduced, and a product of uniform high quality has been assured.

Use of Portable Power Tools Reduces Assembly Costs

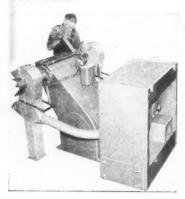
In many shops it has been found possible to realize considerable economies in assembly operations by using portable power tools for jobs on which hand tools or fixed-location tools were used previously. Not only may time be saved on the jobs themselves; but, in addition, the use of portable power tools often eliminates the necessity of using jigs, and, therefore, it eliminates the time required to build and set up the jigs.

The use of an all-purpose Ingersoll-Rand electric impact tool at the Progressive Machine Works in Reading, Pa., may be cited as a good example of how a portable power tool is being

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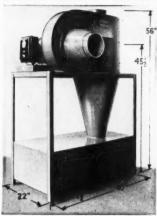
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used to save time and money on various jobs while at the same time increasing production. Two of the jobs which are performed with the tool are those of running nuts on high pressure liquid level gauges and tapping holes in knitting machine frames. On both jobs, an increased production of approximately 50 per cent has been realized since the introduction of portable power tool operation.

The liquid level gauges which are

produced at the plant are used extensively in oil refineries, in chemical processing and rubber plants, and for various types of steam boilers. As il-



Fig. 1—A portable electric impact tool is shown being used to run 7/16 inch hex nuts on liquid level gauges.

lustrated in Fig. 1, the electric impact tool, with socket wrench attachment, is used to put $\frac{\pi}{16}$ inch nuts on bolts which fasten the gauge covers. Since the gauges are used for high pressure units, the covers must be especially tight; and, at the same time, care must be taken in running the nuts to make certain that the gauge glass is not broken. The electric impact tool provides the required uniform torsion and the necessary power to tighten the nuts without cracking the glass.

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Fig. 2—By using a portable electric impact tool for this tapping operation, the need for a jig is eliminated.

of gauge sections used, and therefore the number of nuts also varies. A fivesection gauge which requires about 70 nuts is the size most frequently built; and previously, using hand methods, a workman was able to prepare, assemble, paint, and test 14 to 16 such sections per day. Now, by using the electric impact tool, the output is increased to 25 to 30 sections per day. Time studies show that the time required to run the nuts has been reduced from 17 minutes to 9 minutes.

The operation of tapping a series of inch holes in a gallows frame is illustrated in Fig. 2. The gallows frame is a heavy, hard-to-handle part which is used on a knitting machine, and ordinarily a work jig would be used to hold the part while the holes were tapped by the usual methods. By using a portable electric impact tool, the need for a jig is eliminated, and therefore a savings may be made in jig construction and in set up time. After a hole is threaded with the electric tool, the end cap on the tool is reversed, and the tap is backed out by motor power.

The Ingersoll-Rand Co. of New York City is the manufacturer of the portable electric impact tool described.





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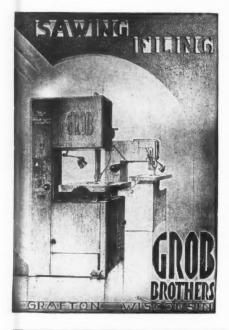
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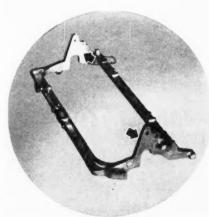


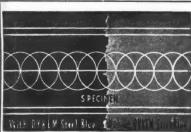
Fig. 1—Aluminum typewriter carriage frame.

Arrows indicate broached faces.

such as is shown in Fig. 1.

Both inside faces, which are indicated by arrows in Fig. 1, are cut simultaneously with a wide broach, the broaching machine being a Colonial 6-ton Pull-down machine with a 36 inch stroke, as shown in Fig. 2. The work holding fixture is so designed that the part is dropped into it with the long "ears" down. The part is located and clamped from both sides so that there is equal support directly behind the faces being broached. With this arrangement, there is no tendency for the light casting to become distorted during the cutting stroke.

The broaching setup consists of a



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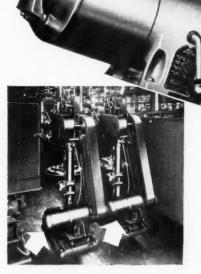
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Above view shows Lima Drives applied to two Garvin Automatic Tappers. Photo courtesy International Harvester Company.

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Company Address wide broach holder having a surface broach insert mounted on each side. A recess in the front of the holder aids in guiding the holder through a guide plate above the work. Broach handling on this machine is semi-automatic; no manual handling of the broach is required.

After the part has been broached, the broaching unit is returned to the

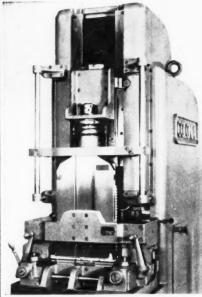
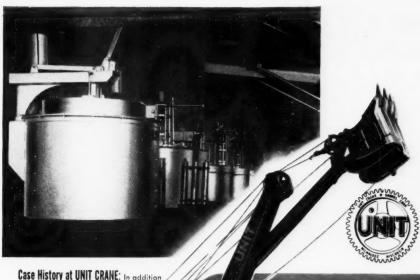


Fig. 2-Colonial broaching machine used for broaching part shown in Fig. 1.

top of the machine where it is held in place by a broach-handling puller. The bar across the center of the machine, seen in Fig. 2, is a part of a puller release mechanism. The broaching speed obtained on the aluminum typewriter carriage frames is 30 feet per minute, and this means that the actual time required to machine both faces of the part is six seconds. Broach return time is three seconds.



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Savings from One Order Pays for Scully-Jones **Automatic Recessing Tool**

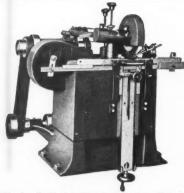
SCULLY-JONES 5-R automatic recessing tool was paid for by the savings made from a single order recently at the Foote Brothers Gear and Machine Corp. plant in Chicago. The tool was used with a special cutting head to cut grease grooves in 3,000 extra heavy duty links, and the increase in production amounted to 100

Fig. 1 shows a close-up of the operation as it appeared to the operator: the tool bit is indicated at X. Fig. 2 shows a link in which a groove has been cut. The links, which were made of drop forged S.A.E. 1045 steel heat treated to 240 Brinell, were 22 inches long and one inch thick; and the two bores in each link were 4.500 inches in diameter. The grooves were cut in the sides



Fig. 1 - Close-up showing Scully-Jones tool used to cut grease grooves in extra heavy duty steel links. Tool bit is indicated at X.

of the bores midway between the sides of the links to a depth of 16 inch and a width of 3/32 inch. The cutting operation was performed at 100 r.p.m., and



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1½" long. For easy insertion, precision alignment, lower half is concentric tapered to fit holes 0.0012 smaller than gage size. Oil hardened tool steel. No other pin gage has such accuracy at so low a cost.

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Sets come in pairs for gaging any number of similar holes. All sets include stands of 3 plates and cover, so that gages stand upright. Drill size is plainly stamped in front of each hole, together with decimal equivalent to the ten-thousandth of an inch.

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UNIVERSAL KWIK-SWITCH" TOOL HOLDER permits 10 second tool changes without accuracy losses UNIVERSAL ENGINEERING CO.

FRANKENMUTH 9, MICH.

an automatic release after each groove was completed permitted the position of the links to be changed for subsequent cuts with a minimum amount of time lost.

The standard Scully-Jones tool is fully enclosed and eliminates the possibility of chips entering the operating mechanism. No rubber bellows or covers of any sort are needed, and



Fig. 2—Operator points to a completed groove in a link.

graduated stop collars permit fine adjustment for the location and diameter of the grooves. The tool is manufactured by Scully-Jones & Co., Chicago.

Surface Plate for laying out work, checking flat surfaces, and general toolroom and shop use is described and illustrated in Bulletin 1005-A available from the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind. Also shown and described are toolmaker's V-blocks and an angle plate available for use with the surface plate. Copy free.

Drill Jig Bushings. An eight-page catalog presenting complete information, including list prices and dimensions, on a line of drill jig bushings and liners has been prepared by the West Coast Aero Tool Co., 5401 Fountain Ave.. Los Angeles 27, California. Copy free upon request.

"Metal Stampings in Small Lots" is the title of an eight-page illustrated catalog issued by the Dayton Rogers Mfg. Co.. 2824 13th Ave., S., Minneapolis 7, Minn., which discusses the facilities of the company for producing duplicate die-cut stampings in small quantities. Copy free.



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61/2" x 18" \$63.15

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103/4" x 37"

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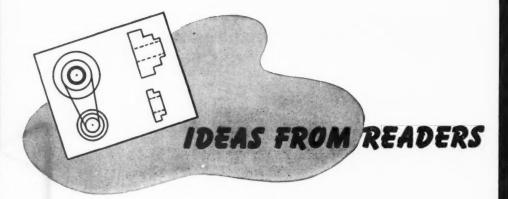
for use on our 5%" x 13" and 61/2" x 18" sizes. When the switch is thrown to "ON" position, the chuck is magnetized, and the work held firmly for grinding. When the work is to be released, the switch is thrown to "DEMAG" and contacts to neutralize the chuck. \$8.90

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Cam Milling Fixture

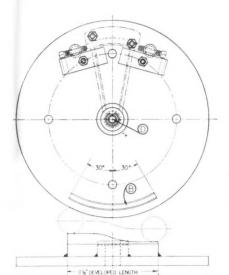
By AARON H. SHUM

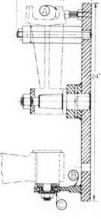
THE accompanying illustration shows an ingenious, economical, and very effective cam milling fixture which was designed for use on a short run production job. The part being machined is a clutch operating cam on a draw works used for oil well drilling, and the surface being machined is designated as A in the illustration.

The fixture is set up on the table of a horizontal milling machine. The master cam, **B**, is made integral with the base of the fixture; its top surface is identical to the cam surface which is machined on the part, and it is located on the base at the same distance from the center as the surface to be machined. Roller bearing, **C**, which rides on the surface of the master cam, is mounted on the arbor support of the milling machine; and, as the table is

rotated about center **D**, the movement of the bearing over the master cam surface controls the generation of a similar cam surface on the part.

The two outstanding features of this fixture are (1) that the initial cost is low and (2) that the master cam is





Cam milling fixture which has master cam integral with base.

Speed and Efficiency Equal - MORE PRODUCTION! - MORE PROFIT!! - LOW COST!!!

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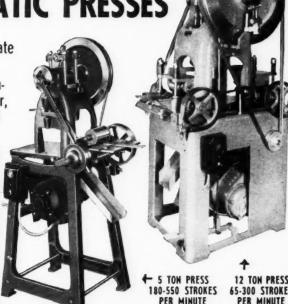
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12 TON PRESS

Built-in Automatic Feed

MACHINE CORP.

2714 IRVING PARK ROAD, CHICAGO 18, ILL.

made integral with the fixture to minimize the storing problem and to reduce set-up time. This latter feature of integration is especially unusual in a rise-and-fall fixture.

Handy Indicator Attachments

By EDWARD DISKAVICH

THE usefulness of an indicator such as is shown at detail A, Fig. 1, may often be increased by attaching to it an indicator holder and or an extension. One example of increased usefulness is to use an indicator of this type, with a holder, in the spindle of a vertical milling machine. The holder and extension may either be bought or made: this article discusses and illustrates the making of a suitable holder and an extension.

The holder, detail B, Fig. 1, is made from a fi inch round section of C.R.S. As may be seen, the lower portion is

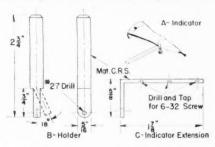


Fig. 1-An indicator, an indicator holder, and an extension.

machined flat and is then bent to an 18 deg. angle as indicated by the dotted lines. The indicator extension is shown at detail C, Fig. 1. It is made from a strip of C.R.S. and is bent to an L-shape.



All A. S. A. standard types and sizes are in stock, ready to fill your order. And if you need new gages or gages salvaged by hard chromium plating, you can also depend on fast delivery. Write for bulletin and price list.



1827 SOUTH 68th STREET . MILWAUKEE 14, WISCONSIN



Noblewest automatic numbering heads are the product of long experience and guaranteed to be the finest obtainable. Standard models are available in any size numbers from 1/40" to ½". Special numbering heads made to any requirements, including embossing heads and numbering heads combined with dies. Write for complete information to Noble & Westbrook Manufacturing Co., 25 Westbrook St., East Hartford 8, Connecticut.

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As shown in Fig. 2, the indicator, in a holder, may be mounted in the spindle of a milling machine so that the center of the indicator ball is in line with the centerline of the machine spindle. A set-up of this kind may be used when trueing round work or when boring holes. Fig. 3 shows an indicator being used with both a holder and an





Fig. 2 — Indicator in use with holder in spindle of vertical milling machine. Indicator extension is shown in foreground.

Fig. 3 — An indicator is used with both a holder and an indicator extension in the spindle of a vertical milling machine.

extension; in this case, the vise is being checked for trueness without moving the machine table any more than is necessary.

A Method of Indicating Gear Accuracy

By HARTINGH W. BABCOCK

IN tool work, the last step to complete many types of gears is to grind the bores after the gears are hardened. Since the important section of a gear is the tooth face area at or near the pitch circle, it is essential that the bore be concentric with the pitch circle. Often the O.D. is out of round with respect to the pitch circle, and so the following method is suggested to assure concentricity be-

GRIND TOOLS TO EXACT ANGLE



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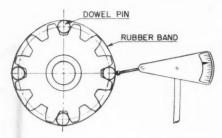
THOMAS PROSSER & SON

1845

120 Wall Street, New York 5, N.Y.

tween the pitch circle and the bore circumference.

The operator obtains four standard hardened and ground dowel pins of



A simple method for checking concentricity between the pitch circle of a gear and the bore circumference.

such a diameter that the pins may be inserted between the tooth faces of the gear. Pins of this type are available in all tool and die shops. The pins are spaced equally around the gear be-

tween the teeth, as shown in the accompanying illustration; and they are held in place by means of a rubber band. The gear may then be placed in a chuck and trued up by using an indicator on the dowel pins. This method gives absolute accuracy in obtaining concentricity between the pitch circle and the bore circumference.

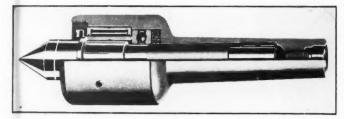
Drafting Instruments Altered to Provide Easier Inking

By A. H. WAYCHOFF

IN order to avoid blotting when using an inking pen with a celluloid triangle or irregular curve, it is best to have the straight edge or curve raised slightly above the surface of the paper. A method of altering a drawing aid, such as a triangle, to provide a permanent slightly raised edge is described herewith.

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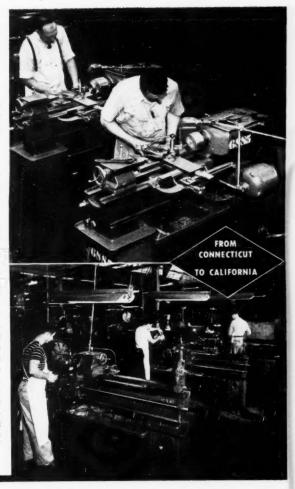
ACME TOOL COMPANY
69 WEST BROADWAY
NEW YORK 7, N. Y.

(Right, above) Two 10" Tray-Top Cintilathes in use in the shop at Pratt & Whitney Aircraft, West Hartford, Conn.

(Right, below) Three Tray-Top Cintilathes in service at Wells Aircraft Parts Company, Los Angeles, Calif.

Wells Aircraft bought its first Tray-Top a year ago and after six months ordered two more. Mr. Elmer Wells writes

" . . . Our work is of an experimental nature or short run jobs on aircraft which demand high grade finishes, close tolerances and trustworthy lathe alignments . . . We believe the Ground Ways are an important factor in producing accurate work . . . Our operators find the 1200 rpm and twelve speeds to be a decided advantage, particularly in changing from steel to aluminum parts of varying sizes and diameters . . . The enclosed Quick Change Gear Box is a good feature; it eliminates chips from clogging the gears."

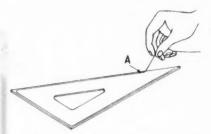


Swing Sizes: 10", 121/2", 15", and 18". 15" and 18" sizes available with gap and gap block. Write for Bulletin T-100-2. Cincinnati Lathe & Tool Co., Cincinnati 9, Ohio.

TWENTY-FEATURE TRAY-TOP

cintilathe

A hard twist heavy thread, No. 8 or larger, should be dipped in clear celluloid and then placed carefully on the flat surface of the instrument, approximately 4 inch in from each edge. This



Heavy thread is dipped in celluloid lacquer and applied to a triangle.

may be seen at A in the sketch. The thread becomes hard as it dries and adheres firmly to the celluloid. In order to get the thread perfectly straight and even, it should be dipped in the lacquer, straightened by pulling it tight with the hands, and allowed to air dry for a minute or two. The straight stiff thread is then given another light coat of lacquer and pressed immediately on the triangle. So that either side of the triangle may be used, thread should be applied to both flat surfaces.

Precision Bench Drilling Machine with capacity for No. 80 to ½-inch drills is illustrated and described in a four-page two-color folder prepared by The High Speed Hammer Co., Inc., 307 Norton St., Rochester 4, New York, Copy free.

"A Quick Review of Denison Products" is the title of a 12-page two-color bulletin (No. 135) prepared by The Denison Engineering Co., 1153 Dublin Rd., Columbus 16, Ohio, covering a line of hydraulic equipment, including the Multipress, an all-purpose press available in 1 to 35-ton capacities; Multipress available in 25-ton capacities; Multipress, and pumping units. Copy free upon request.

ACCURATE WITHIN .0005"



tion precision.

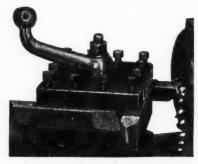
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WRITE FOR CATALOGUE No. 48

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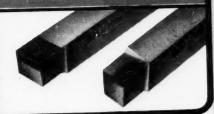
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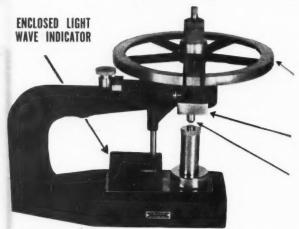
Substantial stocks of above tools, plus Carbide Tipped Counterbores, Saws, Core Drills, Ejector Type Tools, etc., on hand ready for prompt shipments. • Many of your special jobs can be served quickly by altering one of the above standard Super tools. A new catalog ready soon.

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CATALOG AND HANDBOOK No. 34



HE Van Keuren Light Wave Micrometer is an instrument of exceptional merit, proven over a period of 15 years. It has enabled hundreds of High School boys and girls to produce and inspect parts to "Hundred Thousandths" of an inch.

The New 0 to 3" Light Wave Micrometer has a 1/2" diameter, 40 threads per inch micrometer screw, which can be made with greater accuracy and which has 3 times the wearing surface of an ordinary micrometer screw. It has an 8" diameter micrometer wheel, with .0001" graduations 1/10" apart. It has a non parallax, vernier index which enables readings to be made to .00001". It has an index lock. It has carboloy tipped anvil and spindle. It is a sturdy, yet sensitive instrument which weighs 17 pounds. It is a portable measuring machine, built for "Sustained Accuracy."

The Light Wave Micrometer is not a comparator. No gage blocks are needed and no errors creep in from worn blocks. It is a direct source of dependable precision—fast, accurate and profitable.

This 208-page volume represents 2 years research sponsored by the Van Keuren Co. It presents for the first time in history a simple and exact method of measuring screws and worms with wires. • It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.

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Brightboy, tested against other methods and materials, is showing cost-conscious production men substantial time and labor savings.

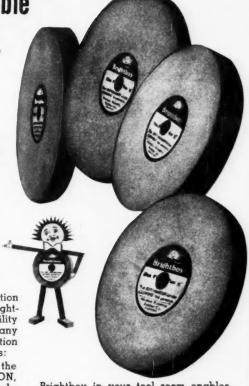
Because of the unique surfacing action of its abrasive + rubber content, Brightboy possesses extensive adaptability and versatility which eliminate many conventional, time taking production steps. Here's what Brightboy does:

- Brightboy is used following the rough grind. IN ONE OPERATION, Brightboy abrasive and rubber, working simultaneously, burr, finish, clean, polish: bridge the gap between the grind and the buff.
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Your dealer will tell you how to test Brightboy in comparison with your presently employed, more expensive work procedures. Ask him for the Brightboy Catalog-Manual. Write the Brightboy Service Department on any production or methods problem where finishing is involved.

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America's Pioneer Manufacturers of
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News of the Industry

Cincinnati Bickford Tool Celebrates Diamond Anniversary

The Cincinnati Bickford Tool Co., Oakley, Cincinnati 9, Ohio, is now celebrating its diamond anniversary. In 1874 Henry Bickford came to Cincinnati from New Hampshire and in a small room at Front and Pike Streets started to build upright drilling machines. In 1887 the business was taken over by what was then known as the Bickford Drill Company who continued the manufacture of upright drilling machines in the same location. A few years later, the company expanded into the radial drill field. The original building at Front and Pike Streets was torn down and a four-story building erected on the same site. The name of the company was changed to the Bickford Drill and Tool Company and gradually only radial drilling machines were made in this plant.

In 1894, August H. Tuechter, who was connected with both the Bickford Drill Company and Bickford Drill and Tool Company, formed, together with Sherman C. Schauer, the Cincinnati Machine Tool Company to produce upright drilling machines. In 1909 the Cincinnati Machine Tool Company and the Bickford Drill and Tool Company were merged. In 1910 both of these shops were discontinued and a

new building was erected in Oakley. In the fall of 1918. Mr. Schauer, who was then vice president and general manager of the Oakley plant, died. Mr. Tuechter continued as president and George P. Gradolf became vice president and treasurer of the company. The death of Mr. Tuechter in 1947 necessitated a rather complete reorganization of the directorship of the company. For a good many years prior to this time, the directors included only Mr. Tuechter, Mr. Gradolf, and O. E. Schauer, son of the founder, Sherman C. Schauer.

The reorganization in March 1948 resulted in an official roster as follows: George P. Gradolf, chairman of the board and treasurer; Ozni E. Schauer, president and general manager; Neil C. Schauer, vice president and sales manager; L. Lee Schauer, vice president and chief engineer; Paul E. Heckel, secretary; and C. Charlton Slete, assistant treasurer.

Lincoln Foundation Announces Awards to Engineering Undergraduates

Awards and scholarships totaling \$6,750 were presented recently by The James F. Lincoln Arc Welding Foundation to engineering colleges and undergraduates

closing the 1948-49 competition of the Annual Engineering Undergraduate



Officers of The Cincinnati Bickford Tool Company: (Left to Right) Neil C. Schauer, Vice President and Sales Manager; Paul E. Heckel, Secretary: George P. Gradolf, Chairman of Board and Treasurer: Ozni E. Schauer, President and General Manager; L. Lee Schauer, Vice President and Chief Engineer

Award and Scholarship Program. The first award of \$1,000 was presented to Robert K. Allen and Alvin H. Kasberg, both seniors in the Department of Mining and Metallurgy at the University of Wisconsin. The subject of their paper for which the award was made was "A Study of the Welding Characteristics of Aluminum Bronze Electrodes." Four scholarships will be established at the University of Wisconsin in honor of these students.

A paper entitled "Design for the Welder" by George W. Grossman, a senior in the Department of Engineering Administration at the Case Institute of Technology, was given the second award of \$500 and two scholarships will be named in his honor at Case. The \$250 third award was presented to John S. Baer, a senior in the Department of Mechanical Engineering at Iowa State College, for his paper entitled "The Design of an Arc Welded Forming Die." In addition to these main awards, smaller awards were presented to 77 undergraduates.

Educational Service Offered by Nicholson File Company

The Nicholson File Co., 48 Acorn St., Providence 1, R. I., is offering to industry an educational service in the form of a talk by Walter R. Buerckel on how to select and use the right file for the job. The lecture, which is illustrated by slides, is simple enough for trainees to understand and is also technical enough to interest and help experienced foremen and machinists. There is no charge for Mr. Buerckel's services, and information on schedules can be obtained by writing to the Nicholson File Company.

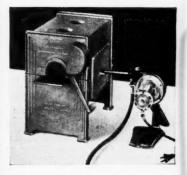
Torit Expands

The Torit Manufacturing Company is adding a sheet steel fabricating department to its main plant in St. Paul, Minnesota, which will enable the company to do its own fabrication of the cabinets for its dust collecting equipment. Work is nearing completion in the consolidation and rearrangement of the other departments to make room for this new manufacturing division. The installation of brakes, shear, and other equipment was completed in mid-July.

To gain more space for these expanded operations, Torit is also constructing an addition to the plant for the storage of oxygen and acetylene cylinders handled by Torit's welding equipment and supply division, St. Paul Welding and Manufacturing Company.

THE "Stark"

"ELECTROBLAST" Fast, Gas Heat!



High Speed Muffle Furnace

WILL your furnace heat to 2350° in 20 minutes? Will it operate for 7c per hour? Does it scale your work?

The "ELECTROBLAST" Furnace will save time, fuel and rejected work. It requires no compressor or piping. Heats work indirectly. Muffle dimensions 7x3½8x2½". Price \$80 as shown. Also a larger furnace 7x4½8x3½".

Stark Tool Company

Established 1862

WALTHAM, MASSACHUSETTS

Originators of the American Bench Lathe

237

Rockford Magnetic Products Purchased by Sundstrand

Bruce F. Olsen, president of the Sundstrand Machine Tool Co., Rockford, Ill., has announced the purchase of the Rockford Magnetic Products Co., 9th St. & 18th Ave., Rockford. The company will be operated as a subsidiary of Sundstrand under the name of Sundstrand Magnetic Products Company and will continue, in its present location, the manufacture of its line of magnetic holding devices, which includes standard chucks for grinders, shapers, milling machines, and lathes; lifting magnets; hand separators; and special holding fixtures.

L. S. Starrett Purchases Burrill Saw and Tool Works

The L. S. Starrett Co., Athol, Mass., has announced the purchase of the Burrill Saw and Tool Works, Ilion, N. Y., manufacturer of "Paramount" band knives and band saws. These products are now being manufactured exclusively by Starrett in its Athol plant and are being marketed under the Starrett name through Starrett distributors.

Production of the newly added products is now streamlined in a new 400-foot x 114-foot building used for manufacturing Starrett hack saws, band saws, band knives, and ground flat stock. With this new building, the manufacturing facilities of the company have been increased to nine acres of floor space devoted to the production of mechanics' hand measuring tools and precision instruments, dial indicators, steel tapes, hack saws, and band saws.

Strang to Represent Amertool **Engineering Service for** Central Europe

Amertool Engineering Service for Central Europe, organized approximately two years ago by a group of American machine tool manufacturers to bring the benefits of American production methods and equipment to industry abroad, will be represented by Ralph Strang through Stenzel & Co., Wiesbaden, Germany. Mr. Strang was recently head of the machine tool department of William Hunt & Co., Shanghai, China, and is well known in European markets where he has the benefit of a long prewar experience in the machine tool field.



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1947 Waverly Ave. Cincinnati 12, Ohio HARGRAVE Tested Tools THE CINCINNATI TOOL COMPANY

There is an Industrial Distributor stock near you

Recent Issue of "Report" Discloses Development of New Grinding Wheel

In a recent issue of its technical magazine "Report from Cincinnati Milling," The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, discloses the development of a new grinding wheel. While many previous publications and technical papers of the company have dealt with basic fundamentals in the study of metal cutting action, "Report" tells how this basic research, applied to various types of single point tools and milling cutters, can be used for the improvement of the cutting action of the abrasive grains in grinding wheels.

"Report" reveals that the company's research engineers' efforts to improve the performance of abrasive grains as cutting tools in the grinding process have included an exhaustive study of the individual grains and their characteristics, together with the many variable factors which affect the wheels themselves. It is said that they have been able to ascertain what are the desirable characteristics and have studied such factors, for example, as pressure, friction, and heat,

which are cumulative in their effect. Further, it is stated that performance records established under everyday operating conditions on all types and sizes of grinding jobs have indicated that the new wheel has characteristics for improved performance.

The new grinding wheel is being produced in limited quantities only and is not available for the market.

S. E. S. A. Annual Meeting

The Annual Meeting of the Society for Experimental Stress Analysis will be held at the Hotel New Yorker, New York, N. Y., on November 30 and December 1 and 2, 1949. Inquiries should be addressed to the Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Massachusetts.

Rockwell Manufacturing Company Forms Power Tool Division

Willard F. Rockwell, Jr., president of the Rockwell Mfg. Co., Pittsburgh, Pa., has announced the formation of a Power

UndersonBALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work . . . saves time . . . saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000





Write for Bulletin No. 9-22

ANDERSON BROS. MFG. CO., Rockford, III.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

Tool Division of the company. The new division has headquarters in Milwaukee and serves as the selling organization for the four divisions of Rockwell en-

gaged in the manufacture of various types of power tools.

Heading the new organization and reporting direct to the president is Robert P. Melius, for many years sales manager of the Delta Mfg. Division in Milwaukee. Delta is one of the divisions whose output is to be marketed through the new Power Tool





Robert P. Melius

kee power tools for metal-working and woodworking applications. Other Rockwell plants whose products are to be sold by the new division are the Arcade Mfg. Div., Freeport, Ill:; Red Star Products Co., Norwalk, Ohio; and Crescent Machine Div., Leetonia, Ohio.

waukee machine tools and Delta-Milwau-

Harold C. Bullard

Harold C. Bullard, plant engineer of The Bullard Co., Bridgeport, Conn., died June 28 in his home after a heart attack. Born in Bristol, Conn., August 14, 1879, Mr. Bullard had been associated for 45 years with the company founded by his father, E. P. Bullard. In addition to his duties as plant engineer, Mr. Bullard also served for many years as a member of the board of directors of The Bullard Company.

Edwin C. Shultz

Edwin C. Shultz, advertising manager, Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., died on July 5, 1949, at his home after a brief illness. He was 51 years of age.

A graduate of Stevens Institute of Technology, Mr. Shultz joined the old Pratt & Whitney Company (now a divi-sion of Niles-Bement-Pond Company) on July 5, 1922. His ability to apply the English language in a clear, concise manner to technical subjects was soon recognized. and he was assigned to advertising work. Throughout the years he has become recognized as a master of technical description and advertising layout.

BRASIVE

EXCLUSIVE AGENTS

ASHEVILLE, N. C. Tidewater Supply Co., Inc.

ATLANTA 1, GA. Childs, W. P. 845 Memorial Drive 8. E. P. O. Box 700

BIRMINGHAM 2, ALA. Young & Vann Supply Co. 1725-1731 First Ave.

BOSTON 16, MASS. Rudel Machinery Co., Inc. 532 Statler Bidg.

BUFFALO 7, N. Y. Keller, George Machy. Co. 1807 Elmwood Ave.

CHICAGO 6, ILL. Marshail & Huschart Machy. Co. 571 Washington Blvd.

CINCINNATI 2, OHIO Motch & Merryweather Machy. Co. First National Bank Bldg.

COLUMBIA, S. C.
Tidewater Supply Co.
DAYTON, OHIO
Motch & Merryweather
Machy. Co.
1305 American Building DETROIT 2, MICH. Cheney, G. H. & W. H. Moreton 5735 Cass Ave. INDIANAPOLIS 4, I. Marshall & Huschart Machy, Co. of Ind. Chamber of Commerce Building
KANSAS CITY, MO.
Blackman & Nuetzel
Machy. Co. KNOXVILLE 5, TENN. Murrian, The W. S. Co. 912 W. Clinch Ave. LOS ANGELES 21, C. Henes-Morgan Machy, Co. Ltd. 2026 Santa Fe Ave.

Motch & Merryweather Machy. Co. 715 Penton Building

CLEVELAND 13, OHIO MINNEAPOLIS 1, M. Satterlee Co., The 118-120 Washington Ave., N.

NEW ORLEANS 6, LA. Dixie Mill Supply Co., Inc. 901 Tchoupitoulas

NEW YORK CITY 17 Rudel Machinery Co., Inc. 100 East 42nd St. NORFOLK 1, VA. Tidewater Supply

Co., Inc. P. O. Box 839 OMAHA 2, NEB. Cardinal Supply & Mfg. Co. 427-30 Sunderland Bidg.

PHILADELPHIA 3, PA. Swind Machinery Co. Broad St. Station Bldg. PITTSBURGH 22, PA. Motch & Merryweather Machy. Co. 717 Liberty Ave.

ROANOKE, VA. Tidewater Supply Co. ROCHESTER 4, N. Y. Keller, George Machy. Co. 509 Commerce Bidg. SAN FRANCISCO 7, C. Jenison Machinery Co. 20th & Tennessee Sts.

SEATTLE 4, WASH. Hallidie Machinery Co. 2726 First Ave., S. SHREVEPORT, LA. Dixie Mill Supply Co., Inc. 200 Edwards Street

ST. LOUIS 8, MO. Blackman & Nuetzel Machy. Co. 3713 Washington Blvd.

SYRACUSE 2, N. Y. Briggs, C. H. Mach, Tool Co. Inc. Onondaga Hotel Bidg. W. HARTFORD 7, CT. Rudel Machinery Co., Inc. 7 South Main St.

RODUCTION ACCURACY 800

Did You Know?---

The Clearing Machine Corp., Chicago, Ill., manufacturer of presses, has named dealers in four New York State areas as follows: (Connecticut and eastern portion of New York State) Harrington-Wilson-Brown Co., 405 Lexington Ave., New York 17, N. Y.; (Syracuse) J. F. Owens Machinery Co., P. O. Box 1144, 1804-1810 Erie Blvd., E., Syracuse, N. Y.; (Rochester) F. W. Schiefer Machinery Co., 514 Elwanger and Barry Bldg., 39 State St., Rochester 4, N. Y.; and (Buffalo) R. L. Crane Machinery Co., 296 Delaware Ave., Buffalo 2, New York.

Arrow-Hart & Hegeman Electric Co., Hartford, Conn., has announced five promotions and additions in its sales department as follows: Howard J. Varley, sales manager of appliance division, promoted to assistant director of sales of the entire company; Gordon Britt, appointed to succeed Mr. Varley as sales manager of appliance division; P. T. Galt, Jr., appointed manager of industrial controls division; Charles H. Tuttle, appointed sales manager and John C. Ellis, assistant sales manager of the latter division.

Scully-Jones & Co., Chicago, Ill., has announced the formation of a Production Parts Division to be headed by J. Dudley Lockrem, vice president. Established primarily to serve the automotive and aircraft industries, the new division offers complete facilities for machining, heat treating, grinding, sub-assembly, and inspection.

The Westcott Chuck Co., Oneida, N. Y., has announced the appointment of Gerald H. Karlen, 141 Broadway, New York City, as its district representative in the metropolitan New York area and the states of Connecticut, Rhode Island, and Massachusetts.

The sole rights for the manufacture of D & M automatic punch press guards has been purchased from Taylor Shantz Inc., Rochester, N. Y., by E. D. Lapsley, and the guards are being produced by the D & M Guard Co., North Tonawanda, New York.

A. J. Rinnander, formerly with the Chicago Pneumatic Tool Company, New York, has become a member of the Harnischfeger Corporation, Milwaukee, where he will supervise field activities, Zip-Lift hoist distributors and sales on a national basis under the direction of E. W. Potratz, manager of the Hoist & Trav-Lift Crane Division.

... By the box or buy the billion they're UNI-QUALITY

B-RIGHT-ON SOCKET SCREW PRODUCTS

Uniform top-quality . . . that's the mark of B-Right-On Socket Screw Products. Best materials...most modern production methods . . . careful inspection keep **Brighton Products** up to that "Excellent" rating they have earned with wise buyers. Compare a pair... compare a hundred . . . Brighton Screws are Uni-Quality.



Want to see for yourself?

FREE SAMPLES

NO OBLIGATION . . . JUST WRITE Specify types and sizes

THE BRIGHTON SCREW & MFG. CO.

READING RD. at DORCHESTER CINCINNATI 2, OHIO

Did You Know?---

John W. Clark has been appointed director of sales and executive assistant to the president of The Capewell Mfg. Co., Hartford, Conn., and will supervise both the Capewell domestic sales and export sales organizations.

The Ferracute Machine Co., Bridgeton, N. J., has appointed the C. R. Terry Machinery Co., 808 Hanna Bldg., Cleveland 1, Ohio, as agent for its complete line of power presses in northeastern Ohio, including the Cleveland area.

The Detroit Broach Company has announced the appointment of Earl W. Keir, 2330 Clybourne, Milwaukee 3, Wis., as representative for the southern half of Wisconsin. Miller-Barber Associates has been named representative in lower New York State, northern New Jersey, and all of Connecticut except Hartford County.

The Carnegie-Illinois Steel Corporation has announced two appointments in the executive personnel of this U. S. Steel subsidiary's Gary steel works. Paul E. Thomas, former chief engineer, has been named assistant to the general superintendent, while Daniel E. Wise has been appointed to succeed Mr. Thomas as chief engineer.

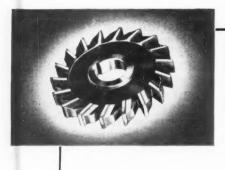
The election of Wm. A. Marsteller and Robert P. Melius as vice presidents of the Rockwell Mfg. Co., Pittsburgh, Pa., has been announced by W. F. Rockwell, Jr., president.

The Industrial Products Division, Elgin National Watch Co., Aurora, Ill., has announced the selection of "Dymo" as the new trade name for its recently introduced diamond compound for lapping and polishing operations.

Willis Kuhlman has been sent abroad by The Monarch Machine Tool Co., Sidney, Ohio, to supervise the installation of 56 lathes (many carrying considerable special tooling) in several European countries.

Malcolm S. Clark has resigned as president and member of the board of directors of The Federal Machine & Welder Co., Warren, Ohio, and has been succeeded by A. S. Blagden, who was recently named executive vice president of Frederal.

Glenn H. Alberga has been appointed plant manager of the Laminated Shim Co., Inc., Glenbrook, Conn., and will supervise all phases of the company's production of shims, shim stock, stampings, and An-Cor-Lox lock nuts.



IMPROVED DESIGN HIGH SPEED MILLING CUTTERS

Standard and special cutting tools, form cutters, slitting saws, end mills, keyseat cutters, center drills, lathe mandrels, tool bits.

Send for our catalog.



78D

MACHINE AND TOOL WORKS

THREE RIVERS

MASSACHUSETTS

A. F. Mack, employed in a production capacity since 1942 by the Thomas Machine Mfg. Co., Pittsburgh, Pa., has been appointed eastern sales representative for that firm. Mr. Mack will maintain headquarters in the Commercial Trust Bldg., Philadelphia, and service the territory from Connecticut to Virginia.

Scully-Jones & Co., Chicago, Ill., has announced the appointment of A. A. Gustafson, 2580 University Blvd., St. Paul W4, Minn., as its factory representative in the State of Minnesota and the Wisconsin counties of Eau Claire and Chippewa.

The Federal Machine & Welder Company has announced the consolidation of operations of the Warco Press Division and the Welder Division in its Plant No. 2, located on Overland Avenue just beyond the city limits of Warren, Ohio.

George R. Kinney has been appointed sales manager of the V & O Press Co., Hudson, N. Y., manufacturer of standard inclinable power presses, high speed metal blanking presses, roll feeds, dial feeds, and high speed notching presses.

The Cleveland branch office of the Federal Products Corp., Providence 1, R. I., producer of precision measuring instruments, has moved to 1511 Warrensville Center Rd., Cleveland 21, Ohio.

John L. MacQuown has been named to represent The Warner & Swasey Company in Hartford, Conn., supplementing the Cambridge, Massachusetts district sales office activity.

Howard Davies, field engineer of the Warner & Swasey Co., Cleveland, Ohio, has been assigned to the Syracuse district sales office of the company.

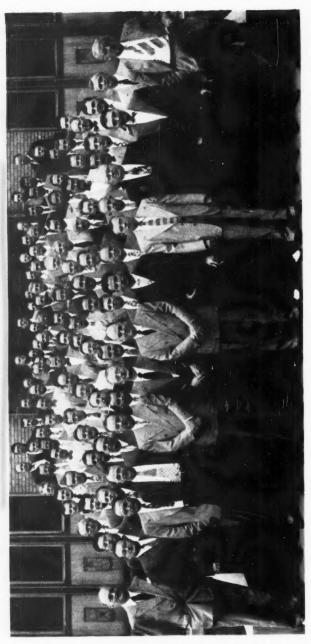
Mark C. Simpson has been appointed Pennsylvania division sales manager of Templeton, Kenly & Co., Chicago, Ill., maker of Simplex jacks.

To better reflect its increased activities, the Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill., has changed its name to Tamms Industries, Inc.

William F. Slomer, former general sales manager of the Fellows Gear Shaper Co., Springfield, Vt., died at his summer residence in Hendersonville, N. C., on August 4 at the age of seventy-one.

James M. Davidson, superintendent of the Buffalo plant of the Farrel-Birmingham Co., Inc., Ansonia, Conn., died July 15 at the Millard Fillmore Hospital following a brief illness.





Personnel Attending National Machine Tool Builders' Association-American Machine Tool Distributors Association Sales Conference, Western Reserve University, July 25-30, 1949

M. Pattison, vice president-sales, Warner & Swasey Co.; Prof. Kenneth Lawyer, Western Reserve University; James C. Hebert, general sales manager, Jones & Lamson Machine Co.; John P. Nugent, Jr., senior sales engineer, Baker Brothers, Inc.; Prof. Harry J. Loberg, Cornell University, Edgar J. Seifreat, president Seifreat Elstad Machinery Co.; Prof. M. J. Barloon, Western Reserve University; Tell Berna, (Left to right, first row)—Edward W. Voss, president, Voss Machinery Co.; Robert E. Morton, sales engineer, Morton Mfg. Co.; B. N. Brockman, vice president and sales manager, R. K. LeBlond Machine Tool Co.; Elmer W. Johnson, sales engineer, Morton Mfg. Co.; Donald general manager, N.M.T.B.A.

September, 1949

(Third row)—Charles F. Austerberry, J. C. Austerberry's Sons; Joseph E. Austerberry, J. C. Austerberry's Sons; Emil Kitzman, W. E. Shiptery Marking Vo.; Harold Nelson, Sr., acles service engineer, George Gorlon Machine Co.; W. H. Rhea, Warner & Swasey Co.; Harvey H. Erack, scher-berioti, Strong, Carlisle & Hammond Co.; Harry G. Lienau, Monarch Machine Tool Co.; C. P. Hooge, Motch & Merryweather Machinery Co.; E. N. Langbauer, E. W. Bliss Co.; J. R. Keen, American Steel Foundries, King Machine Tool Div.; John F. Spillman, Kearney

& Trecker Corp.

(Second row)—Robert Bevis, Cincinnati Milling & Grinding Machines, Inc.; R. J. Miller, Jr., Gisholt Machine Co.; E. K. Baxter, Gisholt Machine Co.; H. C. Soukup, sales engineer, Giddings & Lewis Machine Tool Co.; Lee Wetherbee, sales and service engineer, Barney Machinery Co., Inc.; Ed Lingenfelter, sales engineer, Giddings & Lewis Machine Tool Co.; Aubrey Ozias, Sheffield Corp.; W. R. Bennett,

Motch & Merryweather Machinery Co.; R. H. Houck, Motch & Merryweather Machinery Co.; R. H. McGrath, assistant to general manager,

(Fourth row)—Harold Earl, Gisholt Machine Co.; L. C. Ethum, Gisholt Machine Co.; George E. Hay, Modern Machine Shop; Richard L. Oatis, Oatis Machinery Co.; James H. Oatis, Oatis Machinery Co.; B. N. Brockman, Jr., export mgr., R. K. LeBlond Machine Tool Co.; William Nelson, sales engineer, Barnes Drill Co.; Harold Johnson, vice president, Barnes Drill Co.; F. M. McGee, sales manager, Bardons

6 Oliver, Inc.; John G. Miller, George D. Miller Co.; Ralph E. Reis, Voss Machinery Co.; Robert A. Brechter, Vandyck Churchill Co.;

J. C. Whitney, owner, J. C. Whitney Machinery Co.

(Fifth row)—R. N. McBeth, McBeth Machinery Co. Joseph P. Zimmerman, Foote-Burt Co.; W. Couts, Sheffield Corp.; Roger Kemman. Charles H. Besly & Co.; J. J. Keane, Landis Tool Co.; K. M. Allen, sales manager, Rockford Machine Tool Co.; Edward K. Welles, Ir.,

Charles H. Besly & Co.; J. M. Gebel, sales engineer, R. K. LeBlond Machine Tool Co.; J. E. Walsh, sales engineer, U. S. Tool Co.; Inc.;

F. R. Lang, sales engineer, R. K. LeBlond Machine Tool Co.: E. C. Wollaeger, district manager, Oilgear Co.; E. L. Riggs, manager machine tool division, Chas. A. Strelinger Co.; Robert W. Tansley, Bryant Machinery & Engineering Co.; J. N. Failing, sales manager, Chas. A. Strelinger Co.; P. H. Proctor, J. H. Ryder Machinery Co., Ltd.: E. A. Aldous, J. H. Ryder Machinery Co., Ltd.

Incorporated: Pierce Beaver, Landis Tool Co.; Lynn Welsh, Landis Tool Co.; Emil Heumann, Voss Machinery Co.; L. J. Fox, Warner &

Swassy Co.; Eugene Josephi, Voss Machinery Co.; Belford F. Hayes, Rees Machinery Co.; Henry R. Hanson, vice president, Wm.

Stamets Co.; Lyman H. Bellows, sales manager, Sheldon Machine Co., Inc.; Thomas S. Wray, sales trainee, Bardons & Oliver, Inc.; H. Holberger, Motch & Merryweather Machinery Co.; Thomas B. Frenzer, sales engineer, Joseph Monahan, Agent.

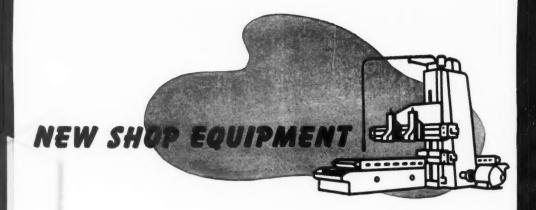
Carl M. Witham, Chas. W. Stone Co.; James H. Bradner, sales engineer, Lees-Bradner Co.; J. C. MacKenzie, F. F. Barber Machinery Co.; Strainer, Pratt & Whitney, Div. Niles.Sement-Pond Co.; J. P. Wissener, Machine Tool Co.; Donald A. Barker, sales, Strong, Carlisle & Hammond Co.; E. S. Belden, Pratt & Whitney, Div. Niles.Bement-Pond Co.; M. J. Taup, district manager, Vickers Incorporated, Arthur E. Schulz, sales promotion manager, Ex-Cell-O Corp., David D. Wallace, chief estimator, Clearing Machine Corp., (Seventh row)—K. A. Ferguson, central sales manager, Oster Mfg. Co.; Robert Callaghan, sales and service, National Machinery Co.;

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Joseph S. Crain, sales, Ex-Cell-O Corp.; Spencer B. Booz, president, Federal Machinery Sales Co.

Primuth, Bardons & Oliver, Inc.; C. A. Johnson, Jones & Lamson Machine Co.

(Last row)—William A. Adams, Lucas Machine Div., New Britain Machine Co.; E. J. Ries, Gardner Machine Co.; George C. Stamets, sales, Bardons & Oliver, Inc.; Elroy sales engineer, Wm. K. Stamets Co.; Charles Gardner Machine Co.; Stephan C. Chubbuck, sales, Bardons & Oliver, Inc.; Elroy



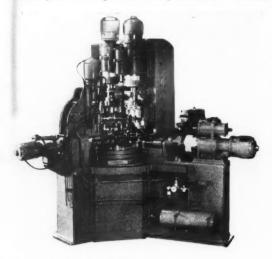
Drill Unit

Available in 2 to 5 h.p. sizes having a maximum stroke of 6 inches, a drill unit identified as the Model No. 5 is announced by the Cleveland Republic Tool Corp., 9615 Meech Ave., Cleveland, Ohio. The unit is powered by a combined air-hydraulic system that incorporates a sealed unit construction which permits operation of the grill unit in any position.

Drill spindle thrust is provided by the plant's air system or an auxiliary supply. The operating principle is based upon a rapid advance of the spindle to an accurate positive stop, followed by metered

hydraulic feed to another positive stop, and then rapid return. The rapid advance travel is said to be consistent to 0.005 inch, and the work feed to final depth is claimed to be held to 0.001 inch. The spindle is normally furnished with a No. 4 Morse internal taper, and the quill is designed so as to be adaptable to multiple spindle drill heads.

Also useful in performing centering, spot-facing, countersinking, milling, and other operations, the Cleveland Republic Model No. 5 Drill Unit is ruggedly constructed and may be readily grouped on welded bases to provide machine tools for various applications.



16-Inch Lathe

An improved 16-inch lathe built to operate at spindle speeds up to 1,080 r.p.m. is being offered by The Boye & Emmes Machine Tool Co., 117 Caldwell Dr., Cincinnati 15, Ohio. The lathe is equipped with an anti-friction bearing headstock, gearbox, apron, and quadrant. The anti-friction bearing gearbox provides for 63 changes of thread, lead, or feed, including 11½ and 27 threads per inch. All gears in this box are of heat-treated alloy steel with shaved teeth.

Machine Tool Incorporating Cleveland Republic Model No. 5 Drill Units



Boye & Emmes Improved 16-Inch Lathe

Other features of the lathe include a graduated tailstock spindle milled for drill tang; one-shot lubrication to the gearbox and quadrant; anti-friction bearing lead screw box; direct reading dials; chrome plated handles and handwheels, and so on.

Special Machine Tool for Pipe Couplings

Product of the Moline Tool Co., Moline, Ill., the machine shown herewith is designed for machining operations on pipe couplings. Clamping jaws can be installed in the work-holding fixture to hold $2\frac{1}{2}$, 3, or 4-inch pipe couplings. While they are held in the trunnion type fixture, the coupling blanks are taper reamed and inside chamfered from each end and then tapped from each end. The fixture has two boring stations, two tapping stations, and two idle stations, one of which is used for loading and unloading. Clamping of the work is performed manually by means of a cam locking mechanism.

Although all reaming and tapping units of the machine operate simultane olocated with respect to the fixture stations that each unit works exclusively in one particular fixture station. The two single-spindle, hydraulic feed reamdraght.

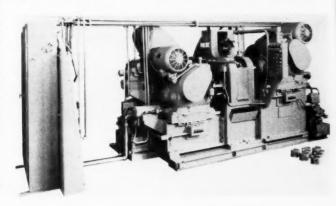
ing units are at the front of the machine and each is equipped with its own hydraulic feed pump for rapid traverse in two directions and feed in one direction. Electrically operated valves on each hydraulic unit determine whether rapid traverse or feed travel occurs. The units move on hardened and ground steel ways. Positive stops on each reaming unit

are adjustable so that correct depth of tapers and chamfers can be assured. A pair of pick-off type gears in each unit is replaceable with other gears if differ-

ent spindle r.p.m. is desired.

At the rear of the machine are two single-spindle tapping units. These units are similar to the reaming units insofar as the spindle drive mechanism and the hardened ways are concerned. All spindles on the machine rotate continuously in one direction while the machine is in operation since automatic collapsing taps make reversal of the tapping spindles unnecessary. Rapid forward and reverse traverse of the two tapping units are effected by hydraulic power from one pump. Feeding of each tapping unit is provided by means of a lead screw which is located on a rear extension of the tapping spindle.

Control of the electrical and hydraulic functions of the entire machine is concentrated in a push-button station convenient to the working position of the machine operator. At the left of the machine is located an electric control cabinet containing a main disconnect switch, motor



Moline Special Machine Tool for Pipe Couplings starters, control relays, and low voltage control transformer. Mounted back-toback with the electric cabinet is the hydraulic control panel where the main electric-operated valves and other principal parts of the hydraulic control equip-

ment are installed.

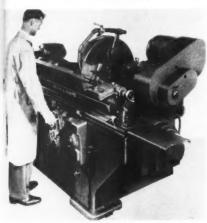
An important feature of the electrical system is the provision that has been made for individual control of each reaming and tapping unit for setup and tool adjustment. This individual control is effected by means of push buttons on each unit, mounted in the same steel housing with the limit switches that determine length of rapid traverse and feed travel.

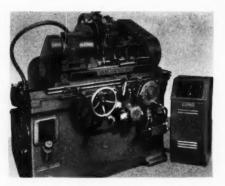
Automatic Cycle Arrangements

The Brown & Sharpe Mfg. Co., Providence 1, R. I., announces an automatic cycle and spark-timing arrangement and an automatic cycle and sizing arrangement for its Nos. 5, 10, 12, 20, 22, and 23 plain grinding machines. The arrangements are claimed to reduce idle time of the machine, minimize attention on the part of the operator, and aid in reducing spoiled work to a minimum. An outstanding feature of each arrangement is the method of bringing the grinding wheel into direct contact with the work while the arrangement is in operation.

The automatic cycle and spark-timing arrangement is said to assure rapid uniformity of sizing and finish as the spark

Brown & Sharpe No. 22 Plain Grinding Machine Equipped with Automatic Cycle and Spark-Timing Arrangement





Brown & Sharpe No. 10 Plain Grinding Machine Equipped with Automatic Cycle and Sizing Arrangement

time is set at a predetermined figure (spark time adjustable from 2 to 180 seconds). When the grinding operation is completed, the wheel slide is withdrawn automatically, the headstock stops, and the coolant is shut off. The work is sized from the accurate crossfeed mechanism of the machine. After loading, the operator makes a single oscillatory movement of the cross-feed handwheel, bringing the wheel into direct contact with the work, and engages the pawl, following which the cycle is completed automatically.

The automatic cycle and sizing arrangement is claimed to minimize the operating skill and effort required for accurate production grinding as it sizes directly from the work, eliminating the necessity of compensating for wheel wear and the effects of wheel truing. After loading, a single oscillatory movement of the cross-feed handwheel and the placing of the sizing gage on the work are the only operations required of the operator. Before the work reaches the finished size. the cycle is switched from coarse feed to fine feed by means of a predetermined setting of the work sizing gage. A reduction in work diameter per revolution of the headstock may be readily obtained by knobs located on the front of the control cabinet. Indicating lights on the front of the panel aid in simplifying the setting of the work sizing gage in conjunction with a master.

Continuous R-F Selective Hardening Equipment

Continuous selective hardening of cylindrical parts at feed rates up to 6 inches



BOYAR-SCHULTZ No. 1 PROFILE GRINDER

This New Improved Oiling System was developed to keep the spindle thoroughly lubricated thus increasing its life of accurate grinding. The vertical oscillating ways are also lubricated in the same system.

With higher standards of accuracy in demand ... and at lower costs, the tool known to supply both is a favorite with every user.

Boyar-Schultz No. 1 Profile Grinder gives you accurate grinding of difficult contours, odd shapes and profiles at time saving speeds.

Many are the jobs that just CANNOT be done economically, by any other method. You owe it to your own shop to investigate this time saving tool.

See our No. 2 Profile Grinder for larger and heavier profile grinding.



A difficult job with ordinary methods . . . easy with Boyar-Schultz No. 1 Profile Grinder. Grinding inside contours.



Outside contours—punches, cams, templates and other pieces ground to scribed lines are speedily finished.



A typical No. 1 Profile Grinder production job. Removing gates and flashing from a plastic part.

BOYAR-SCHULTZ CORPORATION

2120 Walnut Street, Chicago 12, Ill.

per second is said to be possible with an r-f hardening system developed by the Westinghouse Electric Corp., 306 4th Ave., Pittsburgh 30, Pa. Operation can be made completely automatic when the cylindrical parts are of such design that they can be hopper-fed into an automatic loading device. When the work has been turned, milled, or drilled such as to necessitate orientation to ensure hardening in the proper places, the magazine of the automatic loading device must be manually loaded. After hardening, parts can be moved to the next production step via conveyor belt.

The equipment consists of three major components; namely, an automatic loading device, horizontal rotating scanner, and industrial radio-frequency generator. The automatic loading device consists of a magazine, designed to accommodate a particular cylindrical part properly oriented (if orientation is necessary a hopper may be substituted); a gate release, solenoid-operated to drop the workpieces in succession on a conveyor belt; and conveyor belt to deliver work to the infeed of the scanner.

The horizontal rotating scanner feeds the work through a work coil and spray

quench assembly. Uniformity of case depth is obtained by controlled feed: concentricity of the case is said to be ensured by positive guiding and rota-tion of the work about its longitudinal axis.

The industrial radio - frequency generator used with the equipment is a standard Westinghouse 10-kw. 450-kc. generator. Larger or smaller units can be used. depending upon the diameter of the work cylinder and

the feed desired. The equipment can be used to harden a wide variety of cylindrical parts in any desired pattern. Automatic selection of the proper electronic control for any particular part is made by a multi-prong plug, attached to the magazine for that part. The plug is wired so that the proper electronie circuit components are set up immediately when the plug is inserted.

The equipment can be adjusted to handle shafts from 2 to 16 inches long and % to 2 inches in diameter.



PRECISION MADE BY THE WORLD'S GREATEST MAKERS OF PRECISION TOOLS

Stores. U. S. PAY. OFF.

HACKSAWS

SM MOLYBDENUM M2 HIGH SPEED STEEL

For high speed, low cost cutting of tough metals

New Standard Unit Packaging 100 Hand Blades in a Box 10 Power Blades in a Box

S.M. S.

BAND SAWS

Packaged in new, handy 100 foot reel dispensers and 250 or 500 foot pull out safety cartons. Also cut to length and welded.

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Write for complete Starrett Hacksaw and Band Saw Catalog MD

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MECHANICS HAND MEASURING TOOLS AND PRECISION INSTRUMENTS , DIAL INDICATORS - STEEL TAPES - HACKSAWS AND BAND SAWS - PRECISION GROUND FEAT STOCK

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THE L. S. STARRETT CO. . World's Greatest Toolmakers . ATHOL, MASSACHUSETTS, U.S.A.

Semi-Automatic Coupling Tapper

Designated as the Model XC-W, a semiautomatic tapping machine which is adaptable for tapping couplings or nuts has been brought out by the Acme Machinery Division, The Hill Acme Co., 4535 St. Clair Ave., Cleveland 14, Ohio. The machine is built in six and eightspindle models and in standard sizes of 1 and 2 inches. Larger sizes are built in four or six-spindle design.

The Model XC-W has an integral designed housing and truss mounted on a box type base. Spindles are splined and independently operated by a worm drive

Acme Model XC-W Semi-Automatic Coupling Tapper

Low-Priced

Broken Tool
REMOVER



Only \$95

It's sensational — Every shop, every tool crib should have one. Removes broken tools and studs by electrical disintegration from a part being machined without damaging the part. Saves castings otherwise scrapped. Set it up on your drill press.

See Your Dealer or Write Us Today.



748 N. Rochester Road Clawson, Michigan, U.S.A. Phone, Detroit: Jordan 4-6173 mounted on anti-friction bearings. Each spindle is equipped with a worm cam which provides for quick return of the spindle to its upper position. The spindles have 8 inches of travel and are each provided with an adjustable hydraulic spindle check to cushion the downward travel of the spindle and thus prevent injury to the taps from impact.

The scroll-type self-centering air-operated chucks used are controlled by valves automatically operated by the vertical movement of the spindles. The chucks are designed for three-point contact and accommodate removable inserts to cover a certain size range of couplings. The chucks also accommodate the supports on which the couplings rest until the movement of the chucks grips the couplings in the inserts where they are firmly held during tapping and released as soon as this operation is completed.

NO BUSHINGS, GUIDES or PILOTS NEEDED!

THE READING BROACH KEYSEATER

The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from 1/8 to 1/8 cutter.

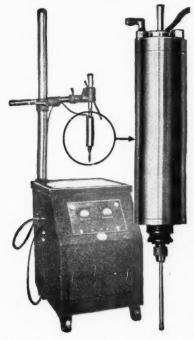
Low first cost-prompt delivery.

READING MACHINE COMPANY, Reading (Cincinnati), Ohio



Improved Metal Disintegrator

A greatly increased cutting speed is among the outstanding a d v a n t a g e s claimed for the 1950 Thomas "Metal Master," an improved metal disintegrator now in production at the Clinton Machine Co., Clinton, Mich. The unit is said to remove a %-inch diameter %-inch long broken tap in 60 seconds, and cut a 0.155-inch hole through ¼-inch Carboloy in 5



1950 Thomas "Metal Master" Metal Disintegrator

minutes, %-inch Stellite in 40 seconds, and %-inch high speed steel in 60 seconds. The speed of the head is electronically controlled. A collect incorporated in the head allows for standardization on a 9-inch Thomlium electrode which may be moved out from the collect as the cutting depth increases.

Uses for the 1950 Thomas Metal Master include cutting holes in hardened dies or keyways or oil holes in hardened gears without annealing the metal; removing jammed or broken screws from fixtures; removing broken gage pins from dies;

GWILLIAM



TYPE TC-FLAT RACES

BALL THRUST BEARINGS

STANDARD SIZES OR SPECIAL DESIGN to your specifications. Our complete catalog will help you in making selection of bearings—shall we send it? Also ask for illustrated literature on Gwilliam ball thrust and roller thrust bearings.

"Serving Industry For 37 Years"

THE GWILLIAM COMPANY

358 Furman St. Brooklyn 2, N.Y.



Being originators of Standard Die Sels naturally we are steps ahead in Design — Precision — Dependability and Economy. Baumbach Die Sels can be disassembled. The Leader Pins and Bushings can be used on other size Die Sels — reducing inventorying a lot of Die Sels. Costly machining time is also reduced. Learn all about Baumbach advantages

before you buy. Write for circular.

E. A. BAUMBACH MFG. CO.
1806 S. Kilbourn Ave. • Chicago 23, III.

cutting round, rectangular, square or hexagonal holes of all sizes in the hardest alloys; cold welding cast iron; arc welding; arc brazing and soldering; drill pulling; air extraction of broken metal pieces: and demagnetizing small parts.

Rubber and Composition Mallets

For use in foundries, factories, repair shops, and other places where hammered surfaces must not be marred, the Indus-

trial Products Co., 2999 N. 4th St., Philadelphia 33, Pa., has added to its Ipco line a mallet with head made of semi-hard rubber. The head is shaped to provide a good hitting surface and is equipped with a sturdy hardwood handle which is firmly anchored to the head. The mallet is said to be especially designed to withstand hard usage without danger of splitting or shattering and is available in three sizes.

A further addition to the Ipco line is a mallet having a head made of a hard fiberous (rubber and fabric) compound

which, it is claimed. will not chip, crack, burr, or dry out. Shaped to provide a broad, flat hitting surface, the head is equipped with a handle made from white ash that is securely attached to the head to prevent danger of disconnection. The mallet is offered in five sizes.



EXCEL

Universal Cutter and **Tool Grinder**

F.O.B. Benton Harbor ith Motor and Standard Attachments-Pedestal Extra

MICHIGAN

The Excel No. 6 is designed to accurately sharpen reamers and milling cutters of a wide variety of shapes and sizes and is also adaptable to cylindrical and internal grinding. Special attachments are available to convert the No. 6 to a multitude of uses in the tool room. Handy storage space for accessories in base.

8" dia. x 16" long Swings work 12" dia. 4" x 24" Face mill capacity..... Table surface Vertical movement of spindle...

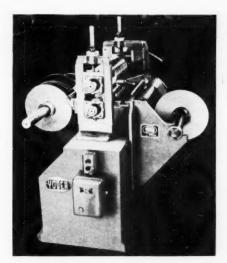
Write for free descriptive literature and name of nearest dealer. Designed and Manufactured by

COMPANY MFG. DEPT. MM-99 BENTON HARBOR,

Small Coil Slitter

A slitter for coils up to 250 lb. and stock thicknesses up to 0.062 inch has been brought out by The Yoder Co., 5532 Walworth Ave., Cleveland 2. Ohio. The machine is equipped on the entry side with a coil holder for unwinding and on the exit side with a recoiler for rewinding the slit strands. Sleeves are provided for the recoiler shaft for the purpose of rewinding strands into coils of different core diameters. The slitting speed is 150 feet per minute.

An entry table bolted to the side of the base is adjustable vertically to maintain the strip in line with cutters of any diameter



Yoder Small Coil Slitter

between 5 and 8 inches. On it are mounted the removable coil-holding shaft, a horizontal idle roller, and a pair of side guides, the latter being adjustable to different widths of strip.

The slitter features alloy steel cutter arbors and micrometer dial-equipped screws for quick and accurate adjustment of the top arbor and maintenance of parallelism. The machine is completely self-contained and intended for use as a coil reslitter by fabricators, as well as rolling mills and their distributors.

Power Shear

The O'Neil-Irwin Mfg. Co., 306 Eighth Ave., Lake City, Minn., announces the addition of a power driven shear to its line of "Di-Acro" equipment. Designed to accurately and rapidly cut square, rectangular or other straight sided blanks, shear extremely narrow strips, and trim edges of sheets or parts, the machine is offered in a 12 and 24-inch size with capacities up to 16 gauge sheet steel.

The shear is operated by a non-repeating positive action clutch, controlled by the operator's choice of either a foot bar or hand lever. A combination blade guard and adjustable hold-down bar is said to ensure the safe high speed operation of the machine and prevent the material from tipping during the shearing opera-

To assemble three parts: Screw, Bale Cup and Lock Nut for fuel pump sediment bulb . . . Formerly done by hand and

then welded one at a time to the bale wire.

THE PROBLEM:



THE SOLUTION:

A DETROIT POWER SCREWDRIVER will Automatically assemble up to 30 units a minute, increasing over-all production up to 300%. All component parts are automatically fed from hoppers directly to positioning fixture. The machine automatically cycles and drives screw by means of friction . . . Completed assembly ejected beneath the table and carried to the welding operator. SEND US A SAMPLE ASSEMBLY for estimate and catalog.



DETROIT POWER SCREWDRIVER CO.

2807 West Fort Street, Detroit 16, • Michigan.

DORMAN **AUTOMATIC REVERSE** TAPPERS



Priced from \$44.00

Write for Bulletin

 AUTOMATIC TORQUE CON-TROL... One Minute to Adjust ... Prevents Tap Breakage.. Operator Need Not Be Skilled

WIDE RANGE OF SIZES

No. 1 FRICTION DRIVE TAPPER -capacity 2-56 to %" in Steel in Aluminum.

No. 2B POSITIVE TAPPER—capacity ¾" to ½" in Steel.
No. 3A POSITIVE TAPPER—capacity ½" to 1½" in Steel—½" to ¾" Pipe Taps.

No. 4A TAPPER—capacity 34" to 2" in Steel including Pipe Taps.

Immediate Delivery

THRIFTMASTER PRODUCTS CORPORATION

1034 N. PLUM STREET, LANCASTER, PA. ADJUSTABLE CENTER or FIXED CENTER PRILLHEADS



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x361/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MARUAL ON FINISHING-WRITE TODAY

Walls sales corp E. 38th St., New York 16, N.Y. tion, thereby assuring a clean square cut.

The design of the shear includes a rugged welded steel cabinet which is finished in machine tool gray and houses the motor and controls. A substantial knee hole in the front of the cabinet provides comfort for the operator and allows for close observation of the work. A gravity chute is provided for the delivery of all sheared materials into a receptacle placed in back of the cabinet. A protrac-



"Di-Acro" Power Shear

ting gage for squaring and mitering which can be quickly and accurately adjusted for any degree of angularity is supplied with the machine.

Electronic Motor Control Unit

The Brown-Brockmeyer Co., Dayton 1. Ohio, has placed on the market an electronic motor control unit which permits remote stepless speed adjustment and control of fractional horsepower motors. Known as the "Dyna-Speed," the unit consists of a rectifier cabinet, especially designed d.c. ball bearing motor, remote control dial box, and 10 feet of connecting cable.

By setting the speed control dial knob,

any speed within a range greater than 20 and 1 (80-1,800 r.p.m.) can be maintained subtantially constant regardless of load changes. Constant torque is also said to be maintained over the entire speed range. The motor speed can be adjusted instantly by the operator at considerable distance from the motor. An idle switch on the control box can be used to turn the motor on and off without changing or disturbing the speed setting. A time delay switch protects the rectifier tubes during the initial warm-up period.

Said to be particularly well suited to

equipment requir-ing speed control and adjustment during operations. such as conveyors. lathes, mixers, and so on, the Dyna-Speed is available in ratings of 1/4 and 1/2 horsepower.

16,000-Lb. Capacity Die Truck

A 16.000-lb. capacity hydraulic elevating truck has been designed for handling large dies by the Lyon-Ray-mond Corp., 2344 Madison St., Greene, N. Y. The truck is furnished with a platform 48 inches wide x 57 inches long. The roller top consists of five rows of rollers placed on 4-inch centers and aids in the transferring of the heavier dies. With the roller top in place, the platform can be lowered to 24 inches or elevated to 38 inches. To provide 3 inches less height in both positions, the top can be removed and the dies are then supported by a flat steel top.

Elevation is made possible by the arrangement of four hydraulic hoists operating against toggle levers. A two-speed hand pump operates the hoists, and a finger-tip release lever controls the lowering speed. The hand winch used to draw dies on the table is geared to a 96-to-1 ratio and is supplied with 25 feet of steel

When positioned in front of a press, the truck can be firmly secured by a special screw type lock that engages the floor. The 10-inch wheels roll easily on ball bearings. An auto type steer arrangement is provided, and the truck has both



Gives You

1700 RPM 3600 RPM 7200 RPM 9000 RPM

Standard Speed Motor Gives You 850 RPM 1800 RPM 3600 RPM 4500 RPM

The new Strandflex 4 speed gear drive machine is one of the outstanding forward steps in the flexible shaft machine business.

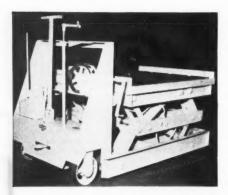
It is provided with two sets of helical cut hardened steel gears. By means of an eccentric driving sleeve assembly, one or more master gears can be engaged by a slight rotary and axial movement.

Write today for a descriptive folder on Strandflex.

N. A. STRAND & CO. DIVISION

STRANI

FLEXIBLE SHAFTS and FLEXIBLE SHAFT MACHINES



Lyon-Raymond 16,000-Lb. Capacity Die Truck

a towing handle for manual use and a towing bar for use with an industrial tractor.

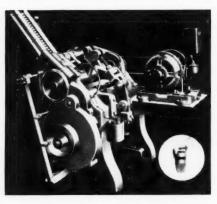
Threading and Trimming Machine

The V & O Press Co., Hudson, N. Y., is offering the No. 302 Threading and Trimming Machine shown herewith, which, in



addition to threading and trimming, can also be utilized for beading, knurling, and curling, either as separate operations or in combination, depending upon the nature of the work. For example, in producing the can illustrated in the inset, parts are placed in a chute by the operator and are then fed automatically to a chuck, threaded, and automatically ejected at a rate of 35 cans per minute. By an interchange of chucks, the cover of the can is handled with the same sequence of operations.

Other items, such as flashlights, film cans, bottle caps, lipstick holders, and so on, can be similarly produced on the machine, which is designed to handle products made of steel up to $\frac{32}{2}$ inch thick. The machine is $\frac{41}{2}$ feet high x $6\frac{1}{2}$ feet wide and measures $5\frac{1}{2}$ feet from front to



V & O No. 302 Threading and Trimming Machine

back. It is powered by a 2 h.p. 900 r.p.m. motor using a V-belt drive, and is provided with automatic lubrication.



THE FINEST TOOL FOR REMOVING BROKEN TAPS

Removing broken taps need not call for the purchase of expensive equipment. Walton Tap Extractors have been used for years by toolmakers and mechanics all over the world. They are easy to use, fast, and economical.

Purchase from your dealer, or write us for Folder No. 10 and details of free trial offer.

THE WALTON COMPANY

HARTFORD 10

CONNECTICUT

A.C.-D.C. Electrode

Claimed to eliminate operator fatigue and danger of burning through light gauge materials, a hand-guided no-gap electrode for use with both alternating and direct current, to be known as the "Eutec-Hand-Omatic," is being marketed by the Eutectic Welding Alloys Corp., Dept. P, 40 Worth St., New York 13, N. Y. In use, the electrode is merely pressed against the metal and drawn straight along, like a pencil, without any back and forth or weaving motion. An ideal weld is said to automatically result.

Claimed to be excellent for welding mild steels, low alloy high tensile steels, and so on. the electrode is available in three types; namely, No. I for all-position welding, No. II for flat and horizontal fillets, and No. III for under-water use. The electrode has a tensile strength of 70,000 to 80,000 p.s.i. and is furnished in 32, 1/8, and 1/2 inch in the No. I type and 1/8 and 3/4 inch in the Nos. II and III types.

Mounting Bolts

Mounting bolts— bolster and T-slot made in accordance with the standards recently adopted by the Joint Industrial Conference of American Manufacturers are available from the West Point Manufacturing Co., 19625 Merriman Court, Farmington, Mich. Tslot bolts are supplied in diameters of 1/2, 5/8, and 3/4 inch and lengths up to 12 inches. One-inch bolts in lengths from 4 to 22 inches are also available.

Forged, machined, and heat treated to necessary specifications, the bolts can be obtained with square heads up to 3 inches and hexagon heads up to 2% inches. Nuts and washers to match are hardened. The nuts are threaded to a close fit, and the washers are ground on both sides.

Steam Cleaner

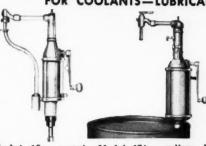
Measuring 44 inches wide x 24 inches deep x 45 inches high, a steam cleaner with an output of 110 gallons of vaporized solution per hour is announced by



PHILLIPS
Quart and
Gallon Stroke
BARREL PUMPS

Phillips single stroke, hand operated Barrel Pumps are available individually or as complete Phillips Tank Units—Can be plated to withstand corrosive liquids. Save time—prevent waste with low-cost, dependable Phillips Barrel Pumps.

FOR COOLANTS-LUBRICANTS



Model 19 — quart stroke, swing return st drain. Adjustable instake. Threaded for 1½ and 2" openings.

Model 174 — gallon stroke, quantity stops, adjustable suction. Threaded for 1½ and 2" drum openings,

Write for prices and FREE Catalog-today!



Model 81 — gallon stroke pump on 65 gallon tank — ideal for battery installation. Can be supplied with casters or dolly. Other sizes are available.



PHILLIPS PUMP & TANK CO.

5050 Brotherton Rd.

Cincinnati 9, Ohio



Kelite Model Q Steam Cleaner

Kelite Products, Inc., Box 2917, Terminal Annex, Los Angeles 54, Calif. Designated as the Model Q, the unit features an automatic type pump, all-steel welded construction, automatic fuel regulator, automatic safety shut-off, high velocity nozzle, aerated gun grips, and so on.

Heavy Duty • Bench Type ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . availble for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.



H. P. PREIS ENGRAVING MACHINE CO.

657 Route 29

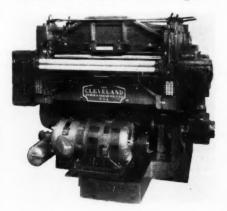
Hillside, N. J.

The Model Q is a completely enclosed cabinet type steam cleaner which is said to require no special skill to operate and weighs 465 lb. Portable models are also available.

Automatic Shear with Roll Feed

The accompanying illustration shows an automatic shear with roll feed which has been brought out by The Cleveland Punch & Shear Works. Cleveland 14, Ohio. The shear, which is equipped with an electrically controlled positive jaw clutch, has a capacity for 48 inches of place inches teel (Rockwell 90 B scale) and is arranged to operate at 60 strokes per minute. However, due to the time delay in feeding stock, the number of cuts depends on the length of stock fed into the machine.

The roll feed consists of five straighten-



Cleveland 48-Inch Automatic Shear with Roll Feed

ing rolls and two sets of punch rolls and is provided with an electrically controlled drum type clutch. The feed is arranged to operate at approximately 120 inches maximum and 6 inches minimum at a speed of approximately 200 feet per minute. However, when desired, a greater maximum length of feed can be provided.

10-Inch Swing Lathe

The Sheldon Machine Co., 4250 N. Knox Ave., Chicago 41, Ill., announces a 10-inch swing lathe with 1%-inch hole



Sheldon "XL" Series Lathe

through the spindle. Known as the "XL" Series, the lathe also features large precision roller bearings; 4-speed (8 spindle speeds) V-belt underneath motor drives; double-walled worm feed apron; quick-change gears; fully enclosed headstock with hinged cast aluminum cover; standard operator controls, and so on.

The machine is available with a 38 or 44-inch long bed mounted on a three-drawer steel cabinet or with a pedestal base in bed lengths up to 62 inches.

Portable Welder Gun Balancer and Hanger

The Platz Company, 20435 Sherwood Ave., Detroit 34, Mich., is now manufacturing a portable welder gun balancer and hanger in several sizes for balancing loads from 10 to 150 lb. Designed to operate on a 4-inch standard I-beam, the unit is said to balance a welding gun in any position in the balancing range (52 inches) without any up or down creep and can be moved up or down with a minimum of pressure.

The hanger has a transformer adjustable mounting bracket which is adjustable from 1½ to 9 inches off center of the main supporting bracket for counterbalancing the overhanging weight of the welding gun and cables. A swivel conduit tube is provided which holds the input and exhaust water hose, control wires, power wires to the transformer, and air





Above: Hand-powered Type A-30 . . . up to 180° bends . . all sizes from ½" to 2". Only 7 parts. World's fastest, simplest machine. Note assortment of bending dies . . this process makes shorter tangents than any other. Occupies only 18" x 18" floor spacel

Other Sizes Available
Factory and Main Office: 14 Furnace St.,
Poultney, Vermont



Above: Motor-powered Type E . . . bends fixed radii of 6 to 1 up to 90°. Type E bends 2½", 3", 3½" and 4" pipe. 3 horse-power motor. Floor space occupied—7' 6" x 7' 6". Other power machines up to 8" capacity.

" American "
PIPE PENDING MACHINE
Company INC.

TAPPER WITH NEW . . .



JACOB Rubber-Flex Chuck

No. 00 B Positive \$40.00 No. 00 C Friction \$45.00

From No. 10 to 5/16 Cap.

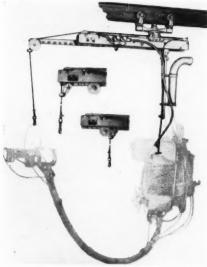
Established 1891

Errington Mechanical Lab., Inc.

Main Office and Works: Staten Island 4, New York

All Sizes in Stock For Immediate Delivery The complete hanger can be revolved 360 degrees and has an adjustable welding gun extension or support arm which allows for a welding gun adjustment of 21 to 60 inches from the transformer. It is also provided with a safety latch which holds the balanced load at the top of the balancing range out of the path of the conveyor line when the air line pressure

or hydraulic hose to the welding gun.



Platz Portable Welder Gun Balancer and Hanger

on, the latch is released by a convenient

control knob.

Hanger
is shut off. When the air is again turned

TROYKE ROTARY TABLES

WORM WHEEL OPERATED ROTARY TABLES



BALL BEARING STATION INDEXING TABLES . . .



12", 15", 18"

See your dealer or write for Catalog 14.

TROYKE MFG. CO.
Cincinnati 9, Ohio, U. S. A.



Heavy Duty Identification Tape

Known as "Topflex," a rugged, heavy duty, pressure-sensitive printed identification tape for industry has been developed by the Topflight Tape Co., Huber Bldg., York, Pa. The adhesive and printed surface of the tape is claimed to have high resistance to moisture, extremes of temperature and abrasion.

Intended for the identification and coding of component parts, for warning and instruction labels, for trade mark and merchandising labels, for display and advertising purposes, and many other uses, the tape is available in a choice of six colors and has a lustrous finish, the imprinting being sealed in the body of the tape so that moisture or abrasion will not deface it.

Bench Drilling Machine

Identified as the Model R-53, a sensitive precision bench type drilling machine with capacity for drills from No. 80 to ¼ inch is being offered by The High Speed Hammer Co., Inc., 307 Norton St., Rochester 5, N. Y. The machine is provided with spindle speeds of 750, 1,500, 3,000, and 6,000 r.p.m. and is designed to drill to the center of a 6-inch circle.

The heat-treated and ground spindle is driven by a molded endless round belt and is guided in a vertical quill supported by annular bearings; thus, none of the belt pull is transmitted to the spindle. Two spindle ball thrust bearings are provided in the machine design to

accommodate both idle and drilling load.
All vital parts of the machine are



"High Speed" Model R-53 Bench Drilling

ground accurately to size and alignment, including the spindle, quill, feed column,



main column, table (horizontal surface and apron), and base. The table can be easily and quickly adjusted for height and may be swung to one side or removed from the main column. The table has a horizontal surface 5¼ x 5 inches with apron 1½ x 5 inches. A self-cleaning taper is said to keep chips and dirt away from the ground main column. The base has a 4 x 6-inch working surface which is 8½ inches from the end of the chuck. The front pulley, upper spindle, and belt are adequately protected by a guard held in position with a thumb nut.

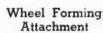
Graphite Film Process

A process for applying a stable graphite film to practically any surface has been developed by the Electrofilm Corp., 7116 Laurel Canyon Blvd.. North Hollywood, Calif. The film, as applied by the process, is extremely thin (0.00015 to 0.0005 inch) but is claimed to have excellent resistance to abrasion and unusual bearing strength. The adhesion to the intended surface is high, and on metal and most other surfaces sufficient diffusion of the graphite into the surface is obtained to ensure the presence of a graphite sur-

face even when the external coating is apparently re-

moved.

The graphite film can be applied by the spray or dip method, following normal surface preparation of the work. For most purposes, no plating is required, although the film can be applied over plated parts. The film is said to provide the intended surface characteristics over temperatures ranging from minus 120 deg. F. and up and is claimed to be unaffected by exposure to solvents and weather.



Known as the "Diaform." a wheel forming attachment which, tracing from templates, is said to form dress grinding wheels to "tenths" by means of a dressing diamond is announced by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. The attachment, which operates on the panto-





P&W "Diaform" Wheel Forming Attachment

graph principle tracing from a 10 to 1 ratio template, can be used on any horizontal spindle surface grinder.

The major portions of the Diaform are

of aluminum alloy so that it is of light weight and therefore easily portable. The attachment is said to form dress to a depth of 1/2 inch on wheels up to 10 inches in diameter and 1 inch in width. All bearings of the attachment are protected from damage by abrasive particles. The diamond is chisel shape and is mounted to rock about the center of a small radius on its tip so that it always dresses the wheel at the proper position as it is moved across the face of the wheel under control of the tracer and template.

Roll Feed

The U. S. Tool Co., Inc., Ampere (East Orange) N. J., announces that its roll feed is now available with an automatic starting and roll release mechanism. With this mechanism, the operator raises the upper roll of the feed into a locked position by means of a ball type handle. With the upper roll in the open position, the stock can be moved through the roll feed and into the die. The stock may be located by sight or by means of a stop.

When the operator trips the press and the ram descends, the roll feed will not



ADAPTABILITY

Stop searching for the proper Tool Holder



ONE TOOL HOLDER for ALL POSITIONS

ELK TOOLS, Inc.

71 W. Broadway

New York 7, N. Y.





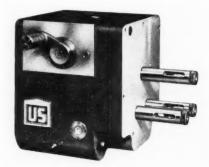
U. S. Roll Feed Equipped with Automatic Starting and Roll Release Mechanism

feed material inasmuch as the upper roll is in the open position. As the ram continues its downward motion and the punches enter the stock, the trip extension located on the ram of the press hits the release cross bar on the feed, and the upper roll is released and returns to feeding position. As the ram ascends and the punches are clear of the stock, the roll feed will start to feed on the upstroke of the ram.

Multiple Speed Drill Head

Product of the U. S. Drill Head Co., Cincinnati 4, Ohio, the multiple speed drill head shown herewith is designed to provide the correct peripheral speed to tools such as drills, taps, and reamers in the machining of different materials. The

U. S. Multiple Speed Drill Head



head is oil lubricated so that it can be operated at high speeds. The maximum speed recommended is 15,000 revolutions per minute.

The gears are of the helical type for noiseless operation and are made of heattreated high carbon alloy steel. Each gear has a small helix angle to keep end

thrust at a minimum.

The speed of the spindles is changed by means of specially designed sliding type gears which are operated by rotating the head lever 180 degrees. The gears are locked in place by a spring-operated plunger. The head can be built with any number of spindles to cover any desired

area and can be used on various types of mount-

ings.

Extruded Shapes

Kennametal Inc., Latrobe, Pa., is manufacturing extruded Kennameta! in three standard shapes - solid rounds, tubes, and flats. Special shapes can be obtained on order. Thestandard shapes are available in lengths up to 10 inches; solid rounds in diameters ranging from through 1/2 inch; tubes in outside diameters from 18 through 1/2 inch with inside diameters specified by the user; and flats in thicknesses of the to % inch and widths ranging from 1/4 through 1/4 inch.

The solid rounds may be used as feed fingers, rollers, laps, scribers, engraving tool points, thread checking wires, punches, and wear pins. The tubes are suitable as wire and thread guides, orifices, nozzles, punch and die

parts, and so on. Flats can be successfully used as centerless grinding rests, wear strips, and for other purposes. The extruded shapes are available in four different Kennametal compositions.

Production Press with Controlled Hydraulic Ram Movement

The Taber Instrument Corp., 111-MS Goundry St., North Tonawanda, N. Y., is producing a press powered by compressed air with hydraulically controlled ram movement and with precise electron-



ic timing features which provide an adjustable preset rate of movement in closing the die or performing an operation. Identified as the Model 129, the press is furnished in several models and capacities and is adaptable for drawing, forming, and assembly operations where a variety of conditions are encountered.

The pressure of the ram is adjustable from 100 lb. to 2 tons. The rate of ram travel is adjustable from 1,000 inches per minute down to 10 inches or less per minute by simple manipulation of the controlling valves. The electronic control panel provides for one or more stop per-

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Taber Model 129 Production Press

iods of varying duration for positions to meet the requirements of the particular work being performed.

Portable Pallet Crane

Grand Specialties Co., 3141 W. Grand Ave., Chicago 22, Ill., announces a portable pallet crane which is said to be ideal for handling shipping cases and barrels in and out of trucks, cars, and so on; handling dies, coils, motors, engines, castings, and other items in and around shops and warehouses. Designated as the No. 40-PC, the crane includes a heavy



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought a more accurate and surprisingly faster way of transferring blind screw holes.

Sa .

The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{3}{16}$ " to 1" diameters. Send for price list.

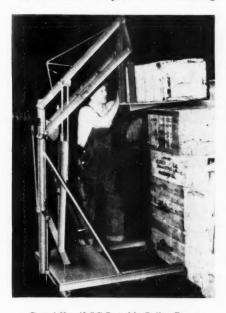
HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio

steel plate pallet, 16 x 24 inches in size, which is designed to handle large heavy bulky objects up to 500 lb., lower to floor level, and elevate to a maximum height of 5 feet 6 inches. The pallet can be stopped at any intermediate height. Regularly supplied with a hand hydraulic lift for easy operation, the pallet can also be supplied with a motorized hydraulic lift.

A hand brake is provided for holding



Grand No. 40-PC Portable Pallet Crane

the crane in any desired position. Equipped with four easy-moving steel wheels, the crane can be quickly and easily propelled to any desired location. The legs, being longer than the pallet reach, may be rolled under benches or machines for maximum ease in loading. Other cranes up to 6,000 lb. capacity can be furnished.

Flexible Coupling

The Morse Chain Co., 7601 Central Ave., Detroit 8, Mich., has developed a silent chain flexible coupling designated as the Series DSC. The rugged all-steel construction of the coupling is said to combine maximum power transmission

REID BROTHERS

A Quality
Grinder with
50 Years Built-in
Experience and
Engineering
Refinement at a
LOW INITIAL COST

Special Features Available

VARIABLE TABLE SPEED, 10 to 36 FPM

ONE SHOT LUBRICATION

SPECIAL DUST PROTECTION

REID BROTHERS CO., INC.
Beverly, Massachusetts
FORWARD GRINDER CATALOG

REID BROTHERS COMPANY, INC.

capacity with minimum space require-

The simple design of the coupling, which consists of two sprockets wrapped with a center guide Morse silent chain, is claimed to assure easy installation. Disconnection is accomplished quickly and easily by either of two methods: (1) by unwrapping of the chain after removing the single connecting pin, or (2) by moving either sprocket endwise out of mesh with the chain. Stock bores range from ½ to 2% inches with horsepower capacities up to 119 h.p. at 2,000 r.p.m. Two covers are available—stamped steel for economy and plastic for maximum protection.

Motorized Centers

An attachment developed by the Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn., can be set up for grinding flat, curved or circular work with straight, taper and contour outlines—simple or in any combination—all within an accuracy of 0.0005 inch. The attachment, known as Motorized Centers, also provides for indexing in the same setting. In addition to its use on surface grinders, the attachment can be used on jig borers, jig grinders, drill presses, light milling machines, and as an inspection tool.

Motorized Centers consists of a rocking

bed which can be swung 20 degrees either side of horizontal. When used with an angle plate. the maximum taper angle becomes 30 degrees. Upon this bed is clamped the base plate dovetailed to permit sliding the head and tailstocks to position. The headstock is mounted on preloaded precision ball bearings and is equipped with a live center and index plate with 24 holes, jig drilled to a tolerance of 0.001 inch for spacing. The simple tailstock readily permits the use of special centers such as male-female and cutaways.

The overall length of the Moore Motorized Centers is 12 inches, and the width (including motor) is 10 inches. The height overall is 8 inches; distance between centers, 6 inches. Designed to swing work up to 6 inches, the unit is equipped with a 1/25 h.p. motor and weighs 34 lb. complete. All steps in the grinding opera-





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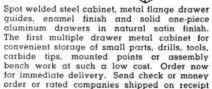
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64 DRAWER UNIT 6" Deep 251/2" Wide 151/4" High Complete set of Dividers and Index Cards supplied.





Moore Motorized Centers

tion can be accomplished with the same setup, since tapers can be reversed or changed by loosening two screws in the rocking bed, and the indexing plate can be engaged by merely pressing a plunger.

Special Collet Chuck

For drilling 60 close center distance holes simultaneously in tractor parts, the Erickson Tools Division, 2301-E Hamilton Ave., Cleveland 14, Ohio, has developed a precision collet chuck designated as the Model '03. The chuck is designed to allow for a minimum center distance of 1% inch and accommodates standard Erickson precision collets.

Improved Milling Attachment

Production of an improved Type 4 milling attachment has been announced by the Fray Machine Tool Co., 515 W. Windsor Rd., Glendale, Calif. A 1½ h.p. motor supplies ample power for precision high-speed carbide cutting, and the "allangle" flexibility permits work at different angles without changing the work setup.

The unit is equipped with precision No. 5 bearings having No. 30 milling machine taper. The drive is effected through an involute 14-tooth spline which is said to transmit uniform power without sidepull. Kinking of the spindle between bearings is eliminated by the short draw-

The Fray Type 4 Milling Attachment features hardened heat-treated alloys in all driving parts and is said to be ideal



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STANDARD

TAPER PINS

The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from ber stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service.

Write for complete catalog giving information on taper pins, Woodruff keys, machine keys and machine racks.

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PLANTS BEAVER FALLS, PA . HAMMOND, INC.



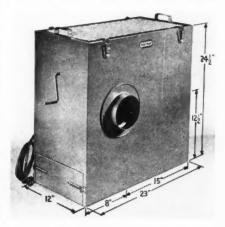
Fray Type 4 Milling Attachment

for milling, drilling, boring and grinding operations. Adapters are provided to permit the use of the attachment on various types of milling machines, planers, lathes, and so on.

Improved Dust Collector

Improvements in the "Dustkop" Model 420 Dust Collector to permit its use in polishing, buffing, and grinding opera-

"Dustkop" Improved Model 420 Dust Collector



Fewer REJECTS!



If you are striving to reduce the number of rejects on tapping and reaming jobs, just get a Ziegler Floating Tool Holder! Because it always floats freely, it compensates for inaccuracies in set-up, even of as much as 1/32" radius or 1/16" dia. Get a Ziegler and see how it will put an end to your misalignment difficulties.

W. M. ZIEGLER TOOL CO.



tions involving larger wheels and greater volumes of dust are announced by the Aget-Detroit Co., 207 Main at Washington Sts., Ann Arbor, Mich. The changes, however, do not involve any increase in floor space requirements or in overall height.

New ratings are provided due to the combined use of a $\frac{1}{12}$ h.p. motor direct driving a new special hi-static paddle-wheel fan. The standard built-in cyclone separator and the second-stage filter of spun glass which subjects the air to a final cleaning before being returned to the working area are both retained.

The increased capacity of the Dustkop

Model 420 permits it to be used to collect dust, lint, and dirt from two grinding wheels (simultaneous use) up to 7 inches in diameter; one polishing or buffing wheel up to 10 inches in diameter; or one 9-inch grinding wheel on production (surface or c u t t e r) grinders.

Hot Plate

A modernly designed hot plate for evaporations, boiling, and general heating in the laboratory or plant has been added to its line of "Temco" electrical equipment by the Thermo Electric Mfg. Co., 488 W. Locust St., Dubuque, Iowa. The unit has a temperature range of from 140 to 850 deg. F. and is controlled by means of an inputcontroller which is automatically compensating for line voltage variations and maintains to extremely close limits the working temperature desired.

To protect the built-in controls and the supporting table or bench from heat damage, a $1\frac{1}{2}$ -inch layer of insulation is provided underneath the heating elements. In addition, a system of baffles, louvers, and air channels is provided to minimize the area for heat conduction and ventilate the lower section in which the controls are housed. The control panel with its control knob, toggle switch, and indicating light is recessed into the body for protection against damage and spillage.

Other features of the hot plate include a stainless steel body and cast aluminum top plate which conducts heat rapidly. Heating elements are coiled from nickel-



SPEED REDUCERS

- Quiet, Efficient Operation
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1/2 to 98 h.p. horizontal top worm.

Over 75 types and sizes. 1/50 to 417 h.p. in spur, worm or combinations. Write today for large Abart data catalog, full engineering details, drawings and etc.

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ABART GEAR & MACHINE CO. MANUFACTURERS OF ABART SPEED REDUCERS

4819 W. 16th St.

Chicago 50, III

chromium alloy with low ratio of watts to surface area, and their embedded construction is said to maintain proper spacing and assure even heat distribution.



"Temco" Hot Plate

The hot plate is available in two sizes of 12 x 12 and 12 x 24 inches for operation on 115 and 230 volts, 50/60-cycle alternating current.

Balancing Ways

Balancing ways designed to provide a quick and accurate means for statically balancing all types of rotating equipment are announced by the Crown Industrial Products Co., 1320 W. 69th St., Chicago 36, Ill. The unit includes hardened discs which are ground on the outside diameter and mounted on precision ball bearings



Crown Balancing Ways

for maximum sensitivity and long life. The bearings are lubricated and sealed when the unit is assembled so that no further maintenance is required.



in a sludge

The Crown Balancing Ways may be set up on the floor or on a bench, with no leveling required. The revolving discs are mounted on solid end castings which are movable on two shafts to accommodate different sizes of work. If desired, the unit can be disassembled for ease in carrying.

The Crown Balancing Ways are furnished in four sizes based on the size of work they will accommodate; namely, 10, 20, 42, and 60-inch swing.

Improved Buffing and Polishing Machine

An improved buffing and polishing machine designed to provide greater movements than heretofore for polishing large areas is announced by the Vanott Machine Corp., 242 Colgate Ave., Buffalo 20, N. Y. The machine is available in three types (single, four, and eight-spindle units), with the head swiveled automatically by depressing a foot lever. Movements at right angles on the horizontal plane are accomplished by two handwheels. The range of vertical adjustment has been increased, and an automatic



Vanott Improved Buffing and Polishing Machine

oscillating movement up to 6 inches is available.

Chucks for holding parts to be polished are custom built to meet specifications.



Roller Chain Repair Set

To facilitate roller chain repair, the Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa., has developed a set consisting of an anvil, fork, and punch. To disassemble the chain, the prongs of the fork are inserted between the side plates of the chain so as to span the two rollers containing the pins to be removed. The fork and chain are then laid in the slot of the anvil which is milled to the contours of the chain to prevent slippage. In this position the chain is suspended on the fork and the pins can be removed by striking each







Atlas Roller Chain Repair Set

one alternately until driven through the links.

Because of its deep base, the anvil can be used without the fork. In this case, the chain rests on the bottom of the slot and the pins are driven into two holes through the base of the anvil. Milled corners on the base allow for secure gripping of the anvil with a vise if desired.

The roller chain repair set is available in sizes to accommodate any standard roller chain.

Lapping and Testing Kit

The Van Keuren Co., 175 Waltham St., Watertown, Mass., announces a micrometer lapping and testing kit designated as the No. 45. The kit is designed for lapping and testing micrometers with a

AERO *SPIRAL FLUTE* COUNTERSINKS STOP CHATTER Cutter No Dia Shank Price Cut clean and accurately, Stocked in 60, 82, 90, 100 degree included angle. Check \$1.50 1909-2 3/8 1/4" 1/4" 1/4" 1/4" 1/2" 1/3" specification chart. Lower prices in quanti-1909-3 1/2 1.80 3/8" ties. Send for catalog sheet. If not avail-1909-4 2.40 3/4" able from your mill supply dealer, order 1909-5 3.10 direct. 1909-6 4.60 1/2" 11/4" 6.60 1909.7 AERO TOOL COMPANY 7.00 1909-8 6948 Avalon Blvd., Los Angeles 3, Calif.



Van Keuren No. 45 Micrometer Lapping and Testing Kit

range of from 1 to 2 inches and is said to enable the micrometer anvil and spindle surfaces to be lapped flat and square with the axis of the screw within 0.00001 inch.

The kit consists of one 1.000-inch x 11/4 inch diameter double surface lap accurately flat and parallel within 0.000005 inch; one 1.0125-inch x 1½-inch diameter double surface lap accurately flat and parallel within 0.000005 inch; one 18 and 14-inch ball tester; and 2 drams of finish lapping compound. The kit is also available in another model, designated as the No. 45A, which consists of the same equipment but with an additional 1.000inch lap and may be used for micrometers with a range of from 2 to 3 inches. Kit No. 45B consists of the same equipment but with $\frac{1}{4}$ and $\frac{2}{3}$ -inch laps in lieu of the 1.000 and 1.0125-inch laps and is designed for micrometers with a range of from 0 to 1 inch. A circular with complete instructions and illustrations on the use of the kits is furnished with each set.

Magnetic Clamping Device

The "Magna-Vise" shown herewith, product of the Hanchett Magna-Lock Corp., Big Rapids, Mich., consists of a pair of magnetically actuated clamps so designed that work parts of non-magnetic materials may be located between the jaws and held firmly against the face of

ROD GRINDING

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TAPER GRINDING

Taper Rods Taper Mandrels Up to 1/2" Diameter Lengths up to 8 Ft.

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Complete Centerless Grinding Service since 1931

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Original Electric Etcher. Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

· Write for circulars and prices.

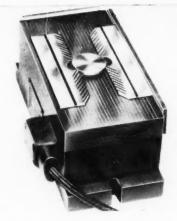
BREWSTER-SQUIRES CO.

P. O. Box 191

Tenafly, N. J.

a magnetic chuck for machining purposes. The device is said to greatly increase the usefulness of magnetic chucking equipment by making it applicable to hold rigid types of non-magnetic material such as brass, copper, plastic, glass, hard rubber, aluminum, stainless steel, and so

The work is placed on the magnetic chuck surface between the Magna-Vise clamps so that the toothed edge of each clamp is in contact with the work (see illustration). Each Magna-Vise clamp is composed of two steel sections connected to each other by a preset spring steel



"Magna-Vise" Being Used to Clamp Non-Magnetic Workpiece on Magnetic Chuck

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill cir-

cles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 18" to 3/4" U.S.S. Inexpensive — Last for years.

Write for Circular NIELSEN TOOL & DIE COMPANY

1960 W. Eleven Mile Rd. Berkley, Mich.

GATE

DRILL and PILOT BUSHINGS Frictionless -Rotary

For core drilling, T. C. and high speed boring, turret tool piloting, etc. Won't stick or clog. Dust proof as a watch.
Write for details.

GATCO ROTARY BUSHINGS CO. 1300 Mt. Elliott Ave.

Detroit, Mich.

strip. The angle of this spring is such that the sections normally will be at 5 degrees to each other. When the chuck is energized, the jaws of the clamps are forcibly drawn to a horizontal position by the magnet, exerting a powerful lateral thrust against the workpiece. The wedging action of the jaws against the workpiece holds it securely in place against the face of the chuck.

Production Machine Tool

Intended to fill the gap between the manually operated drill press and the single purpose special machine, the "Autodrill" shown herewith, product of the Auto Tool & Engineering Co., 2908 W. Armitage Ave., Chicago 47, Ill., is a packaged automatic machine that is fully va-



LE COUNT'S BOILER CLAMPS

Dependable for Boiler work, Welding or extra heavy Machine Shop Service. Openings 3" to 10" inc. Depth of throat 5" on all sizes.

W. G. LE COUNT TOOL WORKS

SOUTH NORWALK, CONNECTICUT, U.S.A.

riable as to mounting, length of stroke, fast travel to work, working feed travel, return travel, and spindle speed. The machine incorporates a combination of rotary and reciprocating motions used for



Autodrill

such operations as drilling, reaming, facing, centering, spinning, and so on.

Complete in itself, only air and electric

power being required for its operation, the Autodrill can be used singly or in multiples with stationary jigs or fixtures to form a simultaneous operation automatic machine. The unit may be used in conjunction with jigs or fixtures mounted on an indexing rotary table or an intermittant moving conveyor to provide a consecutive operation automatic machine. The Autodrill, which has a 4-inch stroke (more if necessary), can be supplied with a tapping attachment if desired.

Automatic Pneumatic Comparator Gage

Bore taper and all finished dimensions on automotive roller bearing races are measured simultaneously by an automatic paper make by the Moore Products Co., H & Lycoming Sts., Philadelphia 24, Pa. According to the manufacturer, the instrument furnishes a direct reading of taper variations as small as 0.00005 inch and sorts the pieces that are within all five tolerances. The gage can be used at speeds up to 1,700 pieces per hour.

Thickness, O.D., large I.D., and small

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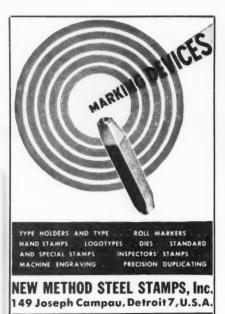
GEO. SCHERR CO., Inc.

GILMORE DIAMOND BORING TOOLS

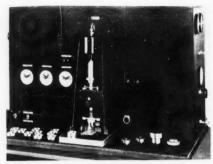


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Diamond-Boring, Turning, Facing, Engraving, Truing Tools, Styli, Gage Contacts.







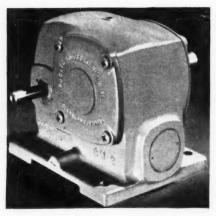
Moore Automatic Pneumatic Comparator Gage

I.D. are measured in one operation by separate air gage components. Positioning of the work is not critical and accuracy is not affected by the human element or by progressive wear, it is claimed. The pneumatic gaging elements are interchangeable so that various sizes of cups can be inspected.

Speed Reducer

Euclid Universal Machine, Inc., 15002 Woodworth Rd., Cleveland 10, Ohio, announces a double reduction, horizontal type speed reducer identified as the CW-2. The capacity of the unit is $\frac{1}{2}$ output horsepower with 1000 inch-pounds output torque depending upon the ratio. the ratio range being from 10:1 to 3840:1.

Euclid CW-2 Sneed Reducer



The Euclid CW-2 Speed Reducer measures 8½ inches long x 7 inches wide x 7½ inches high and features aluminum alloy housings, phosphor bronze worm gears, 20-degree pressure angle gearing, ground thread worms, and Timken roller bearings. The input shaft of the unit is ½ inch in diameter and the output shaft is 1 inch in diameter. Oversize shafts are available on special order.

Tube Flaring Machine

A machine having the capacity for flaring, flanging, squaring, and burring either ferrous or non-ferrous tubing from ½ to 5 inches in diameter is being offered under the name of "Tubemaster" by the Leonard Precision Products Co., 10052 E. Larson Ave., Garden Grove, Calif. Adapters are furnished with the machine to allow for the use of tools and dies furnished for previous models. Where required, tooling is available for beading operations.

The Tubemaster is powered with a 2 h.p. motor and vari-speed drive, provid-



"Tubemaster" Tube Flaring Machine

ing a range of speeds from 70 to 550 r.p.m. for handling a variety of materials.

MULTIPLE DRILLING with a...



MULTI-DRILL

Increases Capacity Up to 800%
ADJUSTABLE TO ANY HOLE PATTERN
. . . FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as ½"—handle drill sizes up to ¾" in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for bis name, literature and complete details.

COMMANDER MFG. CO.

Product of Commander - Builder of the Commander Tapper

Steel Ball Penetrator

An interchangeable steel ball penetrator designed for accurate hardness testing in all makes of Rockwell testing machines is announced by Clark Instrument, Inc., 10200 Ford Rd., Dearborn, Mich. The penetrator is made of hardened steel with an unusually fine, smooth finish, and is ground to a precise roundness, providing smooth, even penetration that is said to assure unusually accurate readings.

The penetrator is available in ½, ½, ½, and ½-inch sizes and can be used with Rockwell scales B, E, F, G, H, K, L, M, P, R, S, V, 15-T, 30-T, and 45-T. The ½-





Clark Steel Ball Penetrators

inch size is furnished as standard equipment with all Clark superficial hardness

testers, and both the ½ and ½-inch size are furnished with the Clark standard hardness

Carbide-Tipped Feed Finger

For use with Brown & Sharpe screw machines. Charles W. Fisher. Rohrerstown, Pa., is introducing a feed finger featuring a tungsten carbide tip brazed in the steel fingers to provide for unusually long wear. Inasmuch as the finger is not of the changeable type, it is claimed to be an excellent item from the standpoint of economy for persons using one di-ameter of feed finger considerably. The finger can be made in various sizes.

Redesigned Right Angle Rotary Actuator

Airborne Accessories Corp., 25 Montgomery St., Hillside 5, N. J., announces



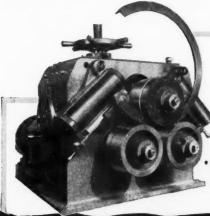
that its electrically powered right angle type rotary actuator ("Rotorac") for intermittent duty aircraft applications, as well as industrial applications, has been redesigned to incorporate the following improvements: (1) increased power rating, (2) decreased weight, (3) built-in radio noise filter, (4) optional position indicating transmitter (d.c. selsyn or potentiometer), and (5) adjustable "center" position switch for indicating or "seeking."

The actuator is offered in one basic model with two motor ratings-standard



"Rotorac" Redesigned Right Angle Rotary
Actuator

power and extra power. On special order, modifications in design may be made.



If you have only 1 angle to roll, you won't need it!

..BUT FOR PRODUCTION ROLLING, IT'S A "MUST"

THOMAS ANGLE-BENDING ROLL

Obviously one, two, six or even sixteen angles won't justify the purchase of this modern Thomas machine. But if your production calls for circles or segments from angles, flats, rounds or other shapes in quantities, the THOMAS ANGLE BENDER may be the solution to your need for greater production at less cost!

BULLETIN 314

describes the four sizes and is yours for the asking. Write for it now! THOMAS

MACHINE MANUFACTURING COMPANY

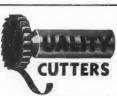
PITTSBURGH, 23, PA.

17

Engine Lathe Cutoff Toolholder

A cutoff toolholder for engine lathes has been added to the line of K-J quick change toolholders manufactured by The Bigg Stava Co., 3357 Union Pacific Ave., Los Angeles 23, Calif. The cutoff tool rests on a supporting blade which is slightly concave along the top edge, while the lower edge of the cutoff blade is convexed to fit. This construction is said to permit the cutoff blade to be fed into the work under power with no chatter or vibration.

The K-J Engine Lathe Cutoff Toolholder is designed to accommodate any stand-



All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

CUTTER SPECIALISTS SINCE 1919.
Write today for prices. A few territories open.

QUALITY TOOL WORKS

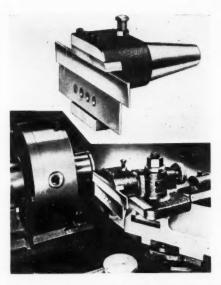


Illustration Showing K.J Engine Lathe Cutoff Holder (Above) and Its Use on an Engine Lathe (Below)



ard ground or unground cutoff blade. An adjusting screw enables the operator to position the blade to the correct height without disturbing the adjustment of other tools he may be using in the quick change toolholder base. The screw rests on a hardened button so as to assure accurate repeating. Bar stock up to 7 inches may be readily cut off with the holder.

Motorized Hydraulic Bench Press

Munton Mfg. Co., Franklin Park, Ill., has introduced a self-contained motorized hydraulic bench press, designated as



Do you have TROUBLE to hold parts PARALLEL and CONCENTRIC?

The SPEEDGRIP PRECISION INTERNAL CHUCK can lick your trouble. It gives extreme accuracy and speeds up production on second operation work—MONEY-BACK guarantee. Layouts made if prints are submitted. Send for descriptive folder today.

SPEEDGRIP CHUCK, INC. 1102 W. Beardsley Ave.



Munton Type "FM" Motorized Hydraulic Bench Press

the Type "FM," which is available in 5, 13, 18, and 20ton capacities. The press includes a 3 h.p. 220/440-volt 3phase 60-cycle motor, hydraulic pump, valves and piping, all enclosed in the housing of the unit. A hand lever is used to actuate and release the ram. A pushbutton switch on the side of the housing controls the motor-driven hydraulic pump.

The ram is mounted on a chromium plated piston which travels in a steel cylinder. Leather back-

up is provided on the seal rings. Valves and reservoir are machined from steel. The motor, pump, and valves are readily accessible from the rear of the housing.

Continuous Measuring Gage

The thickness of the plastic coating deposited on copper electrical wire is said to be accurately and automatically controlled with Federal Model 493 B-59 Continuous Measuring Gage shown herewith, product of the Federal Products Corp., 1144 Eddy St., Providence, R. I. A Federal



Federal Model 493 B-59 Continuous Measuring Gage

Electricator, which transmits electrical impulses when dimensions are out-of-tolerance, automatically controls the machine so that a uniform coating thickness is maintained. If desired a continuous thickness recorder can be installed so that supervision can keep a continuous record of machine fluctuations, down



time, and various other operating factors.

The parallel precision rollers which contact the coated wire are said to maintain their parallelism regardless of coating thickness. The pressure of the rollers can be varied to suit the hardness of coating material.



Mance Special Center Cut Bolt Cutter

Special Bolt Cutter

For cutting case hardened bolts, chain, reinforcing rod, and other hard materials, the Manco Mfg. Co., Bradley, Ill., has designed a special center cut bolt cutter

with chisel type jaws made of forged tool steel, specially heat treated for this type of work. Through compound leverage, the tool affords a cutting power of 2 tons at the jaws with a pressure of 50 lb. at the handles.

The cutter is available in 18, 24, 30, and

36-inch sizes with capacities up to 76-inch rod. The special center cut head assembly is designed to fit standard bolt cutters now in the field and may be obtained separately if desired.



PLAIN INDEX CENTERS

Can Be Used on ANY Milling Machine

Kempsmith Plain Index Centers for production and general indexing . . . simplify job set-ups . . . relieve the operator of the necessity of counting or making any calculations. Indispensable in milling taps, reamers, small gears, sprocket wheels, special grooving, etc. Described in Bulletin No. 124.

Kempsmith Standard Attachments broaden the scope of your milling machine . . . lower capital investment . . . save in set-up time.

KEMPSMITH MACHINE CO. 1835 SOUTH 71st STREET MILWAUKEE 14, WIS., U.S.A.



in all popular sizes or types. Adaptable to ANY make of milling machine with standardized spindle.

EMPSMIT

Precision Built Milling Machines Since 1888

Magnetic Ground Contact

The Luma Electric Equipment Co., P. O. Box 132-MS, Toledo 1, Ohio, has developed a magnetic ground con-tact for use with its electric marking tools. Designed to provide a quick and efficient means for grounding the material to be marked, the contact is available in two types; namely, Type SC-GA for Luma combination and standard etchtools and Type M-GA for Luma master etchtools.

Any size or shape of work can be readily marked due to the fact that a strong long-lasting magnet is built into the housing of the magnetic unit, firmly holding the ground contact to the work. De-



Luma Magnetic Ground Contact in Use

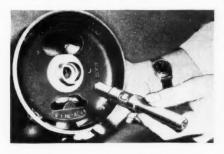
signed for easy handling, the contact is furnished as optional equipment with all new etchtools and is so constructed that it can be used on all etchtools now in use without the need of any alterations. The contact is furnished in two sizes; namely, 100-ampere capacity for Luma combination and standard etchtools and 200-ampere capacity for use with Luma master etchtools.

Bearing Tool

Worn sleeve bearings can be removed from motor end plates and new bearings inserted in one operation with a tool developed by the Wagner Electric Corp., 6489 Plymouth Ave., St. Louis 14, Mo. The tool consists of a steel rod, accurately finished to accommodate precision bored bearings on one end and unbored bearings (for undersize shafts) on the other. A central shoulder separates the two ends.

The new bearing is slipped on the rod, its unchamfered end against the shoulder of the tool. A spacer, furnished with the tool, is slipped on with its unchamfered

Wagner Bearing Tool with New Bearing and Spacer in Position



CLIPPER

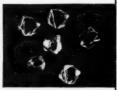
PRECISION DIAMOND TOOLS

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Turning Tools

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CLIPPER DIAMOND TOOL CO., INC. 21°C W. 46 ST. N.Y. 19



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FOR EVERY
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HEAVY BEVEL
STAMPS

Here are the most wideby known and most practical stamps for all marking purposes. Made of MECCO alloy steels which eliminate dangerous spalling and mushrooming—in character sizes from 1/32" up. Impressions are deep and clear cut.

- No Spalling
 No Mushrooming
- 25% to 50% More Service Less Fatigue
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PITTSBURGH 19, PA.

end against the new bearing. The end of the tool is then inserted in the old bearing from the inner side of the end plate and a press or rawhide mallet used to drive the tool until its shoulder seats against the end plate. The spacer forces out the old bearing, and the new bearing, as it is pushed into its proper position, forces out the spacer.

The Wagner Bearing Tool is available in four sizes for motors with finished bearing sizes of 0.655, 0.751, 0.812, and 1.062 inches.

Ratchet Adapter

Compactly designed to permit a ratchet action in extremely limited quarters, a ratchet adapter announced by J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y., can be used with any of the ½-inch square drive



Williams Ratchet Adapter

Fiske

DIE CASTING • FORGING
UPSETTING

Compounds

FISKE'S 231 DIE CASTING COMPOUND excellent for die casting zinc and aluminum alloys. Results in cleaner, smoother pieces, free from surface imperfections and discolorations. Stronger and more accurate castings due to minimum gas formations. Does not flash, fume or solder.

FISKE'S GRAPHITE HOT DIE COMPOUNDS for best results in forging and upsetting operations. They eliminate carbon formation on dies, increase die life, with more pieces between changes. Application by brush, swab or spray.

There is a Fiske Lubricant for every metal working operation. Each is an outstanding product and results in more production, better finish and increased tool life. Let us solve your special problems. Write today to Fiske Brothers Refining Co., 131 Lockwood St., Newark 5, N. J., or 1502 Oakdale Ave., Toledo 5, Ohio.



METAL WORKING LUBRICANTS

handles or attachments such as Speeders, T-handles, flex handles, and so on.

Made from selected alloy steel and fully finished in bright chrome plate, the adapter is 2½ inches long and measures 1¼ inches in diameter. The ratchet gear has 30 teeth. The ratchet action is instantly reversible by means of a shift lever.

Improved Boring-Facing Tools

The Maxwell Co.. 6325 Broadway, Bedford, Ohio, announces that it has modified its E-Z-Set boring-facing tools to include a n e w quick-reversing feature which adapts the tools to a wide variety of production machines for singlepoint facing operations, especially machines not equipped with reversing spindles. The new feature is said to permit quick reversing of the tool block after it has been fed out to maximum facing diameter and stopped.



Max-WELL-Made E-Z-Set Improved Boring-Facing Tools

The quick-reversing modification is available on the E-Z-Set Model No. 41 (15-inch maximum capacity) and Model No. 42 (20-inch maximum capacity) tools. The Model No. 40 (7-inch maximum capacity) has not been changed since it is used extensively with jig borers and

WHEN

you want "the best" in cap screws, set screws, milled studs and coupling bolts, remember . . .

WHO

MAKES THEM

*WHO is ... Wm. H. Ottemiller

Write for name of nearest distributor and our free illustrated folder. other similar machines equipped with reversing spindles.

In addition to a boring bar for both maximum and minimum diameters, a stub boring bar for facing operations has been added as standard equipment to the improved E-Z-Set line of tools. A complete line of interchangeable shanks has also been added to the E-Z-Set tool line so that Max-WELL-Made boring-facing tools can be adapted to all types of production machines.

Eccentric Bushing-Type Broach Adapters

The Kase Machine Co., 18432 Buffalo Ave., Cleveland 19, Ohio, has available a line of eccentric bushing-type adapters intended for use with standard \%, 5\%, \%, 1, and 1\%-inch Glenny broaches. With the adapters, one size broach can be used to cut accurate keyways in six different bores. To cut a keyway in a bore which is larger than broach diameter, a bushing-type adapter is inserted into the workpiece and a standard diameter broach is passed through it to make the cut. The shoulder on the adapter prevents if from falling through during the cutting

MARK and DEMAGNETIZE

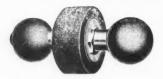


The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-MS TOLEDO 1, OHIO

IMPROVE

GRINDING WHEEL PERFORMANCE WITH METCALF WHEEL DRESSERS



INSURES

SHARP, CLEAN, OPEN wheel face, DEFINITELY IMPROVING cutting action. Resulting in better work piece performance. Easy to hold and operate. MM-99.

HANCHETT MANUFACTURING CO.

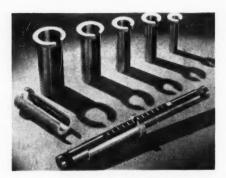
BIG RAPIDS, MICHIGAN

ALMOND DRILL CHUCKS



Maximum Gripping Power with
Extreme Accuracy and
Long Life.
Write for Catalog.

T. R. Almond Mfg. Co.
Ashburnham, Mass.
U. S. A.



Eccentric Bushing-Type Adapters for Glenny Broaches

operation, and blade bending or breakage is said to be eliminated by passing the entire broach through the workpiece.

The adapters are claimed to feature 0.005-inch accuracy and are fabricated of hard chrome-plated steel. They are available individually or in sets, in sizes ranging from ½ to 2 inches outside diameter. Adapters designed for use with any one size tool will accommodate all the interchangeable blades that are available for use with that specific Glenny broach.

Abrasive Wheel

Known as the Fibrex Red Wheel, a synthetic resin bonded grinding wheel of unusual strength and durability is announced by the Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37,

Simonds Fibrex Red Wheels



Pa. Manufactured from laminated sheets of cotton fiber filled with abrasive grain, the wheel has a field of application between that of heavy grinding and light sanding, as well as for certain types of abrasive cutting-off, deburring, and finishing operations.

The wheel is offered in a 7 and 9-inch depressed center type for use on portable disc sanders and right-angle type portable grinders, and as a straight type wheel in 6, 8, 10, and 12-inch diameters having a thickness of ½ inch for cutting-off operations and general purpose use. Slightly flexible, the wheel allows for a certain amount of side pressure without risk of wheel breakage and is said to cut fast and clean without fraying or tearing out at the edge.

The Fibrex Red Wheel is claimed to have numerous advantages for weld grinding, particularly on stainless steel and for cleaning up rough, ragged surfaces on structural steel work, fabricated metal parts, and so on.

ing the automatic end zone punch press guard shown in the accompanying illustration. The design includes a spring



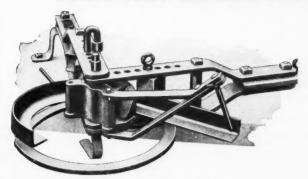
D & M Automatic Punch Press Guard Installed on Press

Punch Press Guard e protection of punch press oper

For the protection of punch press opertors, the D & M Guard Co., 820 Revere Ave., North Tonawanda, N. Y., is offer-

loaded swinging bracket which is directly connected with the ram of the press so that a complete sweep of the guard is as-

LET THE HOSSFELD UNIVERSAL IRON BENDER SOLVE YOUR BENDING PROBLEMS



Bends Angle Iron either Inbend or Outbend also flats, rounds pipe conduit and thin wall tubing.

Bending Angle Iron Inward

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HOSSFELD MANUFACTURING CO

WINONA

MS-9

MINNESOTA

sured whenever the ram descends. As a result, the operator's hands are swept out of the danger zone before the die space closes.

The guard is designed to fit all open sided presses and can be easily installed by drilling two holes on each side of the press. The transparent guard shield allows for complete visibility at all times.

Turret Attachment

A sensitive turret attachment designed to afford the operator delicate "feel" of the work being performed on a turret

Granite Surface Plates

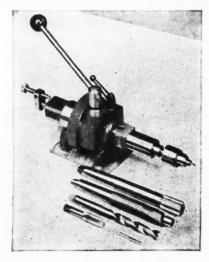
Durable • Accurate • Economical

The inherent hardness and durability of granite, accurately finished to a guaranteed tolerance of .00005", provide the most efficient and economical surface plates for precision measurement operations. Sizes up to $8' \times 16'$.

★ Non-Magnetic ★ Can Not Warp
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lathe is being offered under the trade name of Star by the Williams & Hussey Machine Co., Inc., Wilton, N. H. In use,



Star Sensitive Turret Attachment

GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pleneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO. Box 596, Philadelphia, Pa. the attachment is mounted in any one of the turret positions and the lathe handwheel is used to bring the turret up near the work. Then, using the lever arm of the attachment to control in-and-out motion, the operator has sensitive finger-tip control of the operation to be performed.

The front of the ram of the attachment is cylindrical and is provided with a No. 4 Morse taper hole, drift pin and shear pin holes. The turret attachment is available in five sizes, each of which is designed for mounting directly on turrets with or without adapters, depending on the make and model of the lathe being used.



TO INCREASE PRODUCTION AND TO IMPROVE EFFICIENCY USE

BUTTERFLY FILING AND DIE MAKING MACHINES

This is a powerful machine for heavy or small precision work in use all over the world: Airplane Factories, Ammunition Plants, Toolrooms where fost production is desired. 4 Models, No. 16, No. 14 "EL" and Model "D." The larger the Model, the bigger the stroke and therefore more filing is performed. Furnished with or without pedestals. Constructed as per specification of U. S. Naval Aircraft Factories.

HARVEY MFG. CORP.

161 Grand St., New York,

Phone Canal 6-5170



Pocket Microscope

For examining and inspecting small objects or surfaces in industry, and so on, the DuMaurier Co., Elmira, N. Y., has



DuMaurier Pocket Microscope

available a precision pocket microscope which is designed to bring out minute details clearly and sharply. Scarcely

larger in diameter than a pencil, the microscope is equipped with four lenses mounted in a satin finish aluminum tube fitted with a handy pocket clip. The microscope is available in a 20-power model which is 5 inches long, and a 40-power model which is 4½ inches long.

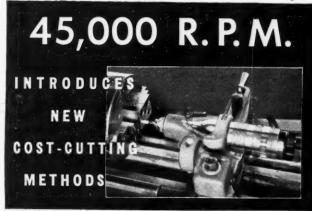
Thread Cutting Broach

A tool which is said to generate an accurately threaded hole by a true broaching action has been added to the line of "Shearcutter" tools offered by the Shearcut Tool Co., Box 746, Reseda, Calif. The accompanying illustration shows how the chips being removed are curled up in one piece and how they flow out of the hole being threaded.

thus preventing interference with the cutting action of the broach and eliminating breakage due to clogging by the chips, it is claimed. The

broach may be easily resharpened on a tool and cutter grinder by simply following a finger and rotating the tool as the table is moved. The broach, it is claimed, may be resharpened many times before it wears undersize.

Additional advantages claimed for the Shearcutter Thread Cutting Broach are that it is practically unbreakable; requires a minimum of power for tapping; works equally well in most materials; does not bind or seize in the hole being threaded; and has a long life. The tool may be used in tapping machines, automatics, turret lathes, or any other machines adapted for tapping operations.



SPEED WITH PRECISION FOR MORE USES

New all-metal housing . . . new, stronger precision quill . . . new sealed micro-precision bearings that never need lubrication. The ideal speed, power and precision for tungsten carbide micro-mills. Use with or without Super COOL-FLEX Attachment or mount in lathe, drill press, milling machine, etc. Grinds, mills, drills, finishes and polishes all materials including the hardest steel. Up to 34 H.P., 115-volt AC-DC motor is protected by replaceable fusetron. Tools and attachments are available for almost any production set-up.

Write FOR CIRCULAR No. F4
PRECISE PRODUCTS CO.
1345 Clark St. • Racine, Wis.



PRECISE SUPER 40



Illustration Showing Manner in which Chips ore Removed from a Hole Being Threaded with "Shearcutter" Thread Cutting Broach

The "Shearcutter" Thread Cutting Broach is interchangeable with standard taps and can be supplied to suit the requirements of the user.

Hydraulic and Lubricating Oil Filter

Identified as the Model 1300, an industrial filter for hydraulic and lubricating oils has been developed by General Filters. Inc., 12890 West-wood, Detroit 23, Mich. The filter consists of a series of spacers and fine mesh screens or other filtering media.

By varying the mesh of the screens, any degree of filtration between 0.040 inch and 5 microns can be obtained. The flow rate can be suited to each application by merely adding subtracting or screens and spacers. By removing one nut, all spacers and screens come apart. Cleaning is merely a matter of washing in a suitable solvent.



Double Duty A. C. Welder

Eutectic Welding Alloys Corp., Dept. P. 40 Worth St., New York 13, N.Y.,

General Filters Model 1300 Oil Filter

announces a double duty a.c. welder known as the "Eutecarc." This standard 200-volt machine features smooth, stepless control for quick and easy adjustment of current to allow for the welding of both light and heavy gauge materials. The Eutecarc is mounted on smooth-



RELTOOL SLITTING CUTTERS

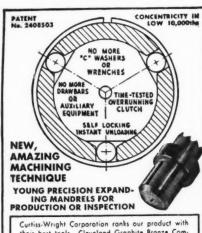
for Every Purpose

- All Types - made to your specifications - of fine tool steel, carefully heattreated and finish-ground all over. Send Blueprints and Complete "Specs." with your Inquiry or Order.

The RELTOOL Line Includes: -

Center Drills . End Mills . Key Seat Cutters Lathe Mandrels
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 Metal Slitting Saws . Tool Bits . Counterbores . Form Tools . Reamers . Taps.



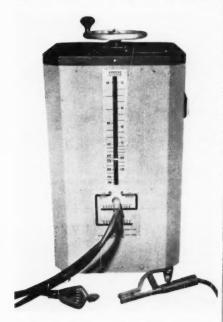


their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR PART PRINT AND FORWARD FOR QUOTES.

Ph. Tower 1-3076 YOUNG ARBOR CO. . Cleveland 13, Ohio 2140 Scranton Road,

operating casters which permit easy transportation around the shop from one job to another. Its overall dimensions are 17 x 17 x 32 inches. An amperage selector control allows for the selection of very small amounts of current ranging from 20 to 285 amperes. The machine is designed to accommodate electrodes from $\frac{1}{16}$ to $\frac{1}{4}$ inch in diameter. Standard accessories include an electrode



"Eutecarc" Double Duty A.C. Welder

holder with cables and ground clamps, wall receptacle and plug, power cable, and helmet.

Boring Tool Holder

A holder (A) especially designed for the use of Bokum single-point boring tools on lathes has been designed by the Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich. The holder (BT-24) has a 1½-inch bore to accommodate the shanks and adapters which are used to hold the smaller tools.

Split bushings(B) with $1\frac{1}{2}$ -inch outside diameters and 1 and $1\frac{1}{4}$ -inch inside diameters are provided for the use of Bokum



THE MOST ECONOMICAL



STEEL TYPE HOLDER

For Light Duty Marking

MODEL 22 - PRICE \$6.00

In Brass, Aluminum, Cold Rolled Steel, etc. All Sizes of Characters up to 5/32" high can be used interchangeably in Holder.

Holder made of Alloy Steel and tempered to prevent mushrooming.



Construction is very simple and foolproof!

Type is notched and a Hooked Rod holds it securely in place. Type cannot be inserted wrong way. Type changed rapidly by simple hook removal.

Holder allows much easier positioning of the impression than any other Holder on the market.



One stroke of hammer strikes entire number evenly, and perfectly spaced. Each Holder can hold 6 sizes of Type.

Write for Bulletin BB22

NUMBERALL STAMP & TOOL CO. HUGUENOT PARK STATEN ISLAND 12, N. Y.

tools Nos. 4 to 12 to afford a boring range of minimum diameters from 11 to 2 inches. An adapter (C) of 11/2-inch outside diameter accommodates tools Nos. 00000 to 3 which have a %-inch shank and theoretically provide a minimum diameter range from 18 to 18 inch.

Shanks of three different diameters with threaded ends are provided for the attaching of the separate cutter heads, Nos. 4 to 12. The shanks are made of heat-treated chrome-nickel alloy of high tensile strength. Centers are provided at each end of the shank to enable the user



to turn down the neck to any desired size

for any practical length required, and to

provide for maximum rigidity.

Bokum BT-24 Boring Tool Holder (A), Split Bushings (B) and Adapter (C)

M - D Facing Heads With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse; feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

MUMMERT - DIXON CO. 120 PHILADELPHIA ST. HANOVER, PA.



3-Way Solenoid Valve

The Skinner Electric Valve Division, The Skinner Chuck Co., Norwalk, Conn., announces a three way bronze body solenoid valve, designated as the Series M-3, which is designed for use with petroleum oils, kerosene, gasoline, water, air, and inert gases at operating pressures from 20 to 150 p.s.i. The valve is available in normally open, normally closed, and directional flow control types with full %-inch orifice and % or ½-inch N.P.T. ports.

All internal metal parts are brass or stainless steel. Soft synthetic inserts are



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS Wilmerding, Pa.



Skinner Series M-3 Solenoid Valve

said to prevent leakage. and a spring-loaded pilot is claimed to ensure positive closing with the valve mounted in any position. The diaphragm is made of tough coated Nylon fabric to assure long life.

The Series M-3 valve may be used for continuous or intermittent duty and has been operated at speeds up to 300 cycles per minute on air. The valve is 5½ inches high x 218 inches x

313 inches and weighs approximately 3% lb. The maximum power consumption is said to be 10 watts.

Standard Screw and Wire Gage

The Dayton Rogers Mfg. Co., 2824 13th Ave., S., Minneapolis 7, Minn., is offering the standard screw and wire gage shown herewith. Made of high quality steel and carefully finished to size, the gage is designed to quickly indicate the size of screws from Nos. 0 to 14, either in wood or machine screw sizes. The lefthand side of the V-slot can be used to measure diameters from 1 to 1/4 inch.

The gage is approximately 3 inches long x 1% inches wide x 16 inch thick. It is fully rust-proofed and may be obtained free of charge when request is made on company letterhead.



Dayton Rogers Stand-ard Screw and Wire Gage

Universal Adjustable Pointing Tool

Designed to facilitate the performance of pointing operations in screw machine work, a universal adjustable pointing tool designated as the Model AT is being of-



Top Rim STEEL STACKING BOXES 18" x 12" x 6". 18 Ga. \$1.38 with Drop Handles

STANDARD SIZES

16 x 10 x 6. 18 Ga. 16 x 10 x 6. . . . 16 Ga. 18 x 12 x 6. 16 Ga.

MADE IN OTHER SIZES



WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices com-parable with that of a standard box.

FACTORY EQUIPMENT CO

183 CHARL

USE ECONOMY

Headless Set Screws Socket Set Screws





Try Them On Your Next Job!

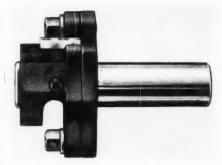
MACHINE PRODUCTS COMPANY

5212 Lawrence Ave., Chicago 30, III.



FALLS PRODUCTS, INC.

Genoa, III.



Boyar-Schultz Model AT Universal Adjustable Pointing Tool

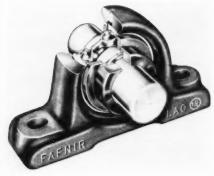
fered by the Boyar-Schultz Corp., 2120 Walnut St., Chicago 12, Ill. The tool can be used for either right or left-hand jobs by the proper adjustment of four easily accessible set screws. The tool is also adjustable to compensate for misalignment between the turret and spindle.

The special rectangular flat tool bit used in the Model AT can be ground with four shapes which can be sharpened by taking a cut off the flat side. An easy adjustment brings the tool bit back to center after sharpening.

Pillow Block

, Incorporating a heavy series ball bearing with wide inner ring and self-locking collar to make installation on a shaft simple and removal easy, a pillow block designated as the LAO Series is an

Fainir LAO Series Pillow Block



124 Genoa St.

nounced by The Fafnir Bearing Co., New Britain, Conn. The bearing has a spherical outside diameter which, when mounted in its corresponding spherical housing, is said to provide for unrestricted self-alignment in any direction.

Available in nine shaft sizes ranging from 1% to 21% inches, the pillow block features a Mechani-Seal labyrinth type closure plus an external slinger member to throw off contaminants when operating at normal speed. For added protection at low speeds or under adverse atmospheric conditions, a combination synthetic rubber and felt washer has been incorporated as an integral member of the seal.

Standard Blanks for Pulley Grooving Tools

A standardized line of solid cemented carbide blanks specifically designed for pulley grooving tools has been announced by the Carboloy Co., Inc., 11143 E. 8 Mile Ave., Detroit 32, Mich. The line is composed of 6 sizes of blanks designed for the tools used in machining pulleys for A. B, and C type V-belts (both 34 and 38



Carboloy Standard Blanks for Pulley Grooving
Tools

deg.). Blank thickness for all sizes is standard at $\frac{1}{16}$ inch; length ranges from 1 to $1\frac{1}{2}$ inches.

Tips for pulleys using belts less than 1-inch nominal width are standard in Carboloy Grade 883; larger sizes in Grade 44A. However, the blanks can be supplied in other grades of Carboloy upon request.



NO WELDING! NO SLEEVES!
NO SHORTENING! NO DISTORTION!
GUARANTEED STRONG AS NEW!

Send them to us like this



We return them like this



Exclusive NU-TANG process †
replaces twisted or broken tangs on any
tool with a Morse taper (sizes 2 to 6).

tool with a Morse taper (sizes 2 to 6).

Any tool—drills, reamers, countersinks, cutters, drivers—repaired perfectly with brand new tangs. Amazingly low cost. Satisfaction guaranteed. NU-TANGS are used by leading industries. Send tools for prompt repairs—or write for prices and literature.

†Patent Pending

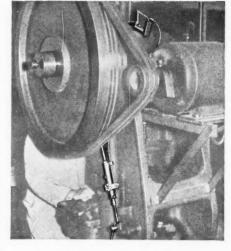
NU-TANGS INC. 1337 Bates Street Cincinnati 25, Ohio

write, Today

Non-Repeat Device for Power Presses

Searjent Metal Products, Inc., Dept. P-13. Box 101, Mendon, N. Y., announces a non-repeat device for small bench presses or large floor presses. Easy to install, the device acts as secondary clutch. The downward action of the press ram releases this clutch, allowing the upper portion of the treadle rod to disengage the primary clutch on the press flywheel. Should the press operator continue to hold the treadle down, the press will not repeat until the operator has brought





Searjent Non-Repeat Device Installed in Treadle Rod of Power Press

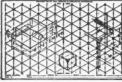
the treadle to the up position. This action will re-engage the clutch in the non-repeat device.

Portable Electric Saw

A portable electric saw with long-shaft transverse motor mounting for extra power and long tool life is being offered under the Thor "Silver Line" trade name by the Independent Pneumatic Tool Co., 175 N. State St., Aurora, Ill. The saw is available in 6, 7, 8, 9, 10, and 12-inch sizes.

Features of the tool include die-cast aluminum housings, fully reinforced and protected to withstand rough handling;





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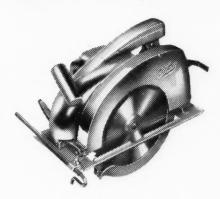
F.O.B. Manchester CHUCK CO.

Box 69

Manchester, Connecticut



steel inserts for bearings and threads to maintain critical parts in permanent alignment; built-in saw blower which is



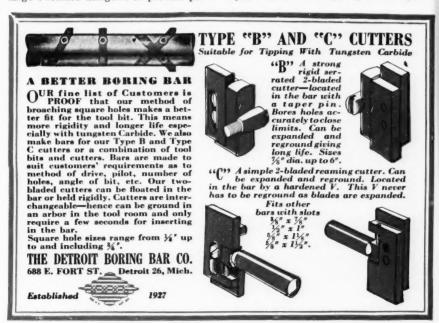
Thor "Silver Line" Portable Electric Saw

arranged to blow from the inside and keep cutting line clear and motor free from dust; steel rip guide with adjustments for any thickness of material being cut; large switches designed to provide positive protection against accidental starting; smooth operating automatic ball bearing blade guard with rubber snubber; finger-tip control for depth and bevel cuts; complete ball bearing construction; and convenient handles for easy tool balancing and handling.

Mechanically-Held Offset Tool

Kennametal Inc., Latrobe, Pa., is producing an offset tool having a mechanically-held Kennametal tip for machining operations such as facing with the tool shank perpendicular to the work or turning with the tool shank parallel to the work axis. The tip of the tool, which is available in right and left-hand styles designated as FRH and FLH respectively, is held in position in a heat-treated steel shank by means of a spring steel clamp. When the tip becomes dull from use, it can be advanced and reground many times until a major part of the Kennametal is used. Grinding is usually required on one surface only. Since no steel is ground from the shank, it serves as a permanent toolholder.

The tool is offered in 5 sizes of 1 inch square x 7 inches long; 1¼ inches square



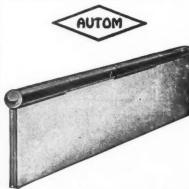
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Kennametal Mechanically-Held Offset Tool

x 7 inches long; $1\frac{1}{2}$ inches square x 10 inches long; 1 inch wide x $1\frac{1}{4}$ inches high x 9 inches long; and 1 inch wide x $1\frac{1}{2}$ inches high x 10 inches long.

Non-Magnetic Precision Collet Chuck

Product of the Erickson Tools Division, 2301-E Hamilton Ave., Cleveland 14, Ohio, the Erickson Non-Magnetic Precision Collet Chuck shown herewith is specially designed for use in inspecting electrical parts. Every part of the chuck except the knurled spanner lock nut is of a non-magnetic conductor material to permit current to flow through the chuck freely for the exacting inspection of the electrical part. A double-angle principle is said to assure the required concentricity through firm, positive contact over the entire outside diameter of the part. The chuck also permits easy loading and unloading of parts for inspection.

Erickson Non-Magnetic Precision Collet Chuck



Live Center

A high precision long-life live center for lathes, to be known as the "Nirol," is announced by L. F. Treichler, 960



"Nirol" Live Center

Route 29, North Plainfield, N. J. Of precision needle bearing design for heavy roughing cuts or extreme accuracy for fine work and high speeds, the revolving center is made of high grade steel heat treated to 62-65 Rockwell C. Radial load is accommodated by two precision ground needle bearings and end load by a heavy duty thrust bearing. A heavy, powerful spring is said to compensate for any expansion of work due to heating during machining.

An outstanding feature of the Nirol is the minimum overhang of the rotating center which is claimed to eliminate any vibration or chatter and also provide additional working space in the machine. If desired, bullnose or female center inserts can be provided for easy insertion

in place of the standard 60-degree center. The Nirol is available in all size tapers.

Power Saw and File Attachment

Featuring an operating mechanism supported on three heavy duty ball bearings and sealed in leadblended petroleum to ensure long life, a portable saw and file attachment known as the "Key-Hak" is being offered by Producers and Distributors, Inc., 4015 MacArthur Blvd., Oakland 19, Calif. Designed for attaching to the user's own electric or air drill or motor-driven flexible shaft of either ¼ or ½ inch Jocobs chuck capacity, the unit is finished in triple chrome plate, weighs less than 4 lb., and is 11½ inches in length.

The Key-Hak, it is claimed, will cut quickly through all metals, including plate stock, stainless, and all types of metal sheet stock, producing straight

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with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1½" dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

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Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.



"Key-Hak" Portable Power Saw and File Attachment in Use

line or radius cuts as desired and leaving a clean burr-free finish without bending or stretching the material.

Ouick-Exhaust Valve

An auxiliary air valve which enables cylinders to start their return stroke in a split second has been announced by the Ross Operating Valve Co., Dept. 157, 120 E. Golden Gate Ave., Detroit 3, Mich. The unit acts as a supplementary exhaust to the regular operating valve. When the latter is in open position and starts to exhaust, it automatically causes the self-operating dumping-valve, which is mounted right at the cylinder, to "dump" the exhaust air, thus permitting the cylinder to start its return trip almost instantaneously.

The Ross Quick-Exhaust Valve is available in % through 1-inch pipe sizes.

Ross Quick-Exhaust Valve



Bench Press with Cutting Head

Known as the "AMPli-Versal," a footoperated bench press with cutting head for wire, rod, or sheet metal has been



"AMPli-Versal" Bench Press

developed by Aircraft-Marine Products, Inc., 1583 N. 4th St., Harrisburg, Pa. The cutting head can be easily removed and any one of seven other special heads quickly inserted for performing such operations as indenting, nibbling, "U"ing, notching, and so on. Blank heads are also available.

Designed to allow the operator free use of both hands for guiding work, the press is furnished complete with a cutting head, foot pedal, adjustable pedal rod, and other parts, ready to set up and operate.

Toggle Clamp

Addition of a new model toggle clamp to its De-Sta-Co line is announced by the Detroit Stamping Co., Finished Products Div., 349 Midland Ave., Detroit 3, Mich. The Model 225-U has been developed to meet the demand for a small, compact clamping unit with clamping bar moving into a retracted, vertical position away from the work as the clamp is opened. Advantages claimed include reamed working surfaces, stainless steel bearings, rugged construction, and smooth, fast, powerful clamping action.

The clamp is supplied equipped with a rubber-tipped bolt assembly, adjustable both horizontally and to work height, and

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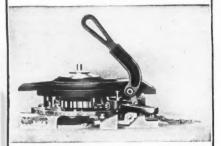
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De-Sta-Co Model 225-U Toggle Clamp

is 1% inches high x 61/2 inches long when the bar is in the horizontal work-holding position.

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DAVIS & LARRICK MFG. CO. Box 191, Route No. 2, Dayton 10, Ohio

All-Angle Precision Vise

The Matco Tool Co., 2030-36 W. Lake St., Chicago 12, Ill., has placed on the market an all-angle precision vise for use

Matco All-Angle Precision Vise



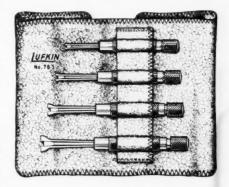
in performing drilling, counterboring, tapping, and reaming operations. With universal attachments available for the vise, the unit can be readily converted into a jig or fixture for production work.

The vise includes a cradle which has a 90-degree range—45 degrees each side of horizontal. The base of the vise can be swiveled 180 degrees and vertically set to 90 degrees. The vise, which also features a screw for fine angle setting, is available in two sizes having $3\frac{1}{2}$ and $4\frac{1}{2}$ -inch jaw widths.

Small Hole Gage

A gage for measuring the diameter of small holes or the width of a shallow slot or groove is being offered in four lengths covering a range of from ½ to ½ inch by The Lufkin Rule Co., Saginaw, Mich. The size of the ball end is adjusted by turning a knurled knob at the opposite end of the gage, and the change in the size of the ball end is practically proportional to the movement of the knob. In addition, the radius of the ball end is always less than that of the hole being measured, thereby making only a two-point contact.

The gage is made of special analysis steel with hardened ball end. Provision is also made whereby travel of the ex-



Lufkin Small Hole Gages

panding cone is stopped at both the extreme open and closed limits of the gage, thus preventing breakage, the manufacturer claims.



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Single Plunger Control Valve

C. B. Hunt & Son, Inc., Salem, Ohio, has introduced, under the trade name of "Quick-As-Wink," a small single plunger valve well suited for use with manually controlled presses, pilot circuits, and in other processing cycles when frequent manual operation is required. The valve consists of an aluminum housing; hollow stainless steel plunger with precision placed ports; carefully dimensioned brass spacers that are accurately positioned end to end on each other; efficient "O" ring packers; closing brass gland nuts; and aluminum push button. The valve is



View of "Quick-As-Wink Single Plunger Control Value Cutaway

balanced and is said to remain in position until changed. A spring can be

mounted between the push button and gland nut when spring return action is desired.

The flow is through the plunger and around the seals, providing for long life of the packing and valve parts and reducing repairs and maintenance to a minimum. The valve can be completely disassembled for repacking and re-assembled in a few minutes without disturbing the connecting piping.

The valve is available in two series, designated as the "O" "OE." which are furnished tapped for either 1/8 or 1/4inch pipe connection and are made in 2-way; 3-way open exhaust: 3way piped exhaust: double 2-way; 4way, and 5-way designs and with either push-pull or push and spring return actions. The valve is suited for use with air, oil or water at pressures up to 125 p.s.i. at normal temperatures. Class valves have a piped

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sharpening and measuring of all sizes of high speed steel or carbide tipped circular form tools. Insures maintaining the original shape of form tool by keeping proper relationship of cut-It's a convenient and accurate aid in ting face to center line of tool.





Louver Notching Unit

one of the many uses for the Wales Louver Notching Unit announced by the Wales Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y. The unit features an independent self-contained design which permits the samegroup of units to be used again and again in unlimited setups in press brakes and stamping presses. Each unit is independently mounted to provide quick setups according to varying patterns.

All parts of the WalesLouver Notching Unit. such as the punch, die, and punch lifter springs, are built into a selfcontained holder so that the punch and die are kept in permanent alignment.

Centerless Shaft Support Chuck

For supporting centerless shafts concentrically in a lathe, the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind., is offering an adjustable collet exhaust. The "OE" valves have an open exhaust and are intended for use with air only.

Louver Notching Unit

Notching long slits in fluorescent fixture louvers is

bushing chuck which is said to make possible the easy and accurate centering in the lathe of any shaft from ¼ to 1 inch in diameter. The chuck is manufactured with a No. 2 or 3 Morse taper shank for use in either the headstock spindle or tailstock spindle of the lathe. Brass collet chucks can be supplied for round stock in sizes from ¼ to 1 inch by 16ths. A special size collet of 0.637-inch round capacity is available for chucking popular types of automobile generator armatures having shafts of this size.

The adjustable collet bushing chuck, when used in the lathe headstock, may





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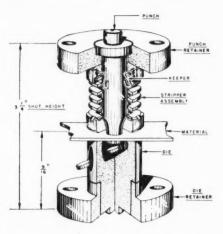


South Bend Centerless Shaft Support Chuck

be adjusted to drive the work or, when used in the lathe tailstock, may be adjusted for an accurate running fit.

Punch and Die Unit

Available in a wide range of stock hole sizes and shapes, a punch and die unit known as the "Holemaster" is being manufactured by Great Western Tools Inc., 3811 Riverside Drive, Burbank, Calif. The unit is small in overall size, light in weight, and has a minimum of parts, all of which are interchangeable. The unit is completely salvageable from job to job, and the die is drilled and tapped to provide for attachment to an air line for automatic slug ejection.



Cutaway Drawing of "Holemaster" Punch and Die Unit

Redesigned End Mill

The Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio, announces a redesigned end mill which is claimed



Cleveland Redesigned End Mill

to provide for greater strength, speed, and accuracy than previously obtainable. The redesigned tool features machine pol-

ished flutes, the shape of which, together with the chip-clearing ability of the tool, is said to reduce wear on the cutting edge, thus maintaining consistent accuracy. The new flute shape is also claimed to provide for maximum cutting qualities at increased rates of feed.

According to the manufacturer, the redesigned end mill has no sharp corners or points where localization of stresses might occur. The new style clearance featured by the tool is said to provide for support at the cutting edge, thereby assuring against "flaking" or "chipping out."

Finger Wrench

Known as the "Touch 'N' Grip," a finger wrench for placing and tightening nuts in locations not easily reached by ordinary wrenches is being manufactured by F. E. Redfield, 31 Colonial Parkway, Dumont, N. J. To use, the wrench is slipped over the end of the index finger, a nut picked up in its hexagonal opening, and the nut and wrench then placed with finger-tip control in the desired location.

The wrench is available in sizes corresponding to the four most widely used nut sizes; namely, 14, 16, 14, and 38

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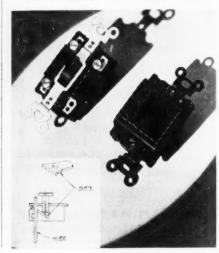
"Touch 'N' Grip" Finger Wrenches

inch across the flat. The wrench is made from high strength nickel-plated steel and is adjustable to fit any size finger.

Flush Tumbler Switch

The Arrow-Hart & Hegeman Electric Co., 103 Hawthorne St., Hartford 6, Conn., is producing a flush tumbler

Hart & Hegeman Flush Tumbler Switch



switch in 10 and 20-ampere ratings for all standard connections. The switch is offered in single and double-pole and three-way, four-way and single-pole, quadruple break models.

Designed for back or top wiring, the switch features a totally-enclosed mechanism and double switch blades of the positive self-aligning type protected by arc-snuffing barriers. The unit is built into a shallow 1½-inch base. Washertype plaster ears are standard on all models.

15-Inch Drill Press

The Famco Machine Co., 1324 18th St., Racine, Wis., announces a 15-inch drill press which is available in seven models comprising bench and floor types in tilting table or one, two, three, and four-spindle production models. Chuck capacity ranges from No. 70 to ½-inch Jacobs chuck, with No. 1 Morse taper optional.

chuck, with No. 1 Morse taper optional. Ruggedly constructed, the drill press has a $2\hat{e}_4$ -inch quill, $4\frac{1}{2}$ -inch stroke, and short six-spline spindle which provides for maximum bearing support and rigidity. Spindle speeds range from 625 to 4,800 r.p.m. on Standard models and from 490

to 3,000 r.p.m. on Slo-Speed models. With the Famco speed-reducing attachment, spindle speeds as low as 185 r.p.m. may



Famco 15-Inch Drill Press

be obtained. The speed-reducing attachment, together with belt guard and tapping attachment, is optional equipment.

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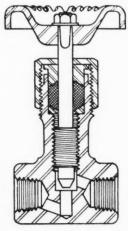
GIDDINGS & LEWIS MACHINE TOOL CO.

Needle Valve

Featuring a one-piece forged body which is claimed to eliminate leakage, an improved high pressure needle valve designed for the control of air, fluids, and gases under pressures up to 3,000 p.s.i. is being produced by the C. A. Norgren Co., 222 Santa Fe Drive, Denver 9, Colo. The valve has a tapered point needle for close flow control and leakproof seating, and the valve stem is hard chrome plated for maximum service life.

The valve is offered in globe, angle, and tee types in ½ and ¼-inch pipe sizes. Each type is manufactured in three ma-

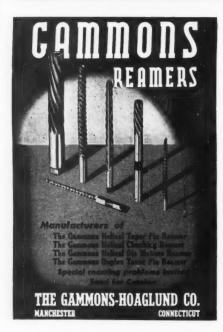
terials—brass, steel, and stainless steel to meet the specific requirements of the medium to be controlled. Steel bodies are



Cross-Sectional Drawing of Norgren Improved High Pressure Needle Valve

cadmium plated, and brass and stainless steel bodies are finished natural. Each type valve incorporates a large, easygrip adjusting wheel.

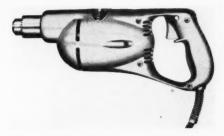
PRESSES F E E D S AUTOMATIC EQUIPMENT The VEO Press Company HUDSON, NEW YORK



1/4-Inch Electric Drill

Designed for the continuous light production drilling of metals and other materials, a ¼-inch electric drill designated as the Model 425 is announced by Cummins Portable Tools, 4740 N. Ravenswood Ave., Chicago 40, Ill. Features include a die-cast aluminum frame; Jacobs 7B geared chuck with chuck key permanent-





Cummins Models 425 1/4-Inch Electric Drill

ly attached to the cord; universal motor for operation on 115 volts, 25-60 cycle alternating or direct current (also 220 volts on special order); no-load speed of 2,200 r.p.m.; momentary contact trigger-type switch with lock for continuous operation; 10-foot three-conductor cord with rubber plug and pigtail for ground.

The drill measures 11½ inches long overall, has a net weight of 4¼ lb. and a shipping weight of 5¼ pounds.

Inside Micrometers

The Rimat Machine Tool Co., Dept. MS3, 1117 Air Way, Glendale 1, Calif., has increased the size range of its inside micrometers used for measuring internal dimensions.

The recent additions to the Rimat micrometer size range are said to completely cover all grooves for "0" ring packing from dash No. 11 through dash No. 79. The new semi-standard models, in addition to standard models, read con-

Rimat Inside Micrometer being Used to Measure Groove for "O" Ring Packing



September, 1949



Compact, powerful, and remarkably economical in operation. JOHNSON Hi-Speed No. 120 reaches 1500°F. in 5 minutes. Delivers 2300°F. in 30 minutes. Easily regulated. Holds temperature at desired level for accurate heat-treating any steels. Ideal for small metal parts. Gets the job done fast to save time and gas. Firebox 5x7¾x13½. Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower. Order Today!

There is a Quick-Acting JOHNSON Unit for every toolroom and shop WRITE FOR FREE CATALOG

JOHNSON GAS APPLIANCE CO.

tinuously from 0.490 to 12.020 inches. Standard tip sizes are 16 and 1/8 inch o.d. on specific models. However, where these are too large, special tips are available for measuring snap ring grooves as small as 0.015 in widths.



Valvair Single-Solenoid Valve

Single-Solenoid Valve

A single-solenoid valve in sizes of 1/4. %, and ½ inch for air pressures of from 0 to 125 p.s.i. is announced by the Valvair Corp., 454 Morgan Ave., Arkon 11, Ohio. All sizes are available for operation on 110, 220, and 440 volts, 50-60 and 20-cycle current.

The Merry-Go-Round that Never Broke Down..

No. this "Merry-go-round" never broke down, but it does break production bottlenecks every day, thanks to versatile De-Sta-Co Toggle Clamps!

It's a high-production assembly fixture for a new plastic ink pad. Here, the bottom of the case is being bonded to the body. Requirements: fast bonding cycle . . . positive clamping pressure for a perfect bond . . . precise alignment of work pieces for accurate assembly. Rapid toggle action, sure holding pressure, rugged durability and well-engineered design make De-Sta-Co No. 207U Toggle Clamps the tool designer's logical choice for this application.

And they're the logical choice, too, for holding parts during Welding Riveting Machining Assembly of plastics, metal and other materials. Whatever your work-holding problem, there's a De-Sta-Co Toggle Clamp that's a "natural" to solve it. The complete line of more than 40 stationary and portable De-Sta-Co Toggle Clamps is shown in Clamp Catalog No. 49. Send for your copy today, and the name of our stocking representative nearest you.

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DETROIT 3, MICHIGAN

Countersink Sets

able.

Of spring return

design, the valve

has a one-piece bronze base, heavy and powerful solenoid for positive seating and cool operation, heavy sheet metal cover for protection, "OU" type packer. and shock-resisting clevis and clevis Two, three, pin. Two, three, and four-way models are avail-

The Grobet File Company of America, Inc., 421 Canal St., New York 13, N. Y., announces that its chatterless countersinks are now being offered in specially designed strong wooden boxes that hold each size separately and securely for proper storage and ready use.

Three sets are available. No. CH of 8 countersinks CB 41 degrees (1/4 inch diameter) to LI 41 degrees (1 inch diameter); No. CI of 9 countersinks CB 41 degrees (1/4 inch diameter) to NJ 41 degrees (11/4 inches diameter); No. CI of 11 countersinks CB 41 degrees (1½ inch diameter) to PK 41 degrees (1½ inches diameter). Special sets comprising countersinks hav-



Grobet Chatterless Countersink Set

ing 50, 55, or 60-degree angles with center line can be made up in units of from 8 to 11 countersinks.

Four-Way Air Valve

A four-way air valve of the balancedpiston type is announced by the Keller Tool Co., Grand Haven, Mich. Designed to control double-acting air cylinders in Keller Airfeedrils and for use with other air tools or fixtures, the valve is actuated by poppet-type control buttons which exhaust air from either end of a balanced piston.

Special design features include a slide



Keller Four-Way Air Valve

valve of molded oil-resistant rubber and a stainless steel, rust-resistant piston for moving the slide valve. Constructed for bench mounting or mounting as an integral part of a fixture with remote control



on easier grinding



You'll get better performance and longer life from all your grinding wheels if you keep them dressed and trued with Desmond dressers. Only Desmond makes a complete line of dressers. And now Desmond offers you a free convenient "Dresser Guide to Better Grinding," an easy to read, two-color, 9" x 12" wall chart for use in tool rooms, shops, and tool cribs. Ask your industrial distributor for this valuable new Guide to Better Grinding or if he cannot supply one, write us direct. The Desmond-Stephan Mfg. Co., Urbana, Ohio.

Desmond

DRESSERS & CUTTERS

of operation, the valve is available with 1/4, 1/2, and 1-inch pipe threads with air capacities of 30, 90 and 350 c.f.m. respectively.

Spider Type Gaging Spindle

A spider type gaging spindle that is said to eliminate the difficulties of cocking and sticking often encountered in checking shallow large diameter holes which offer a minimum of bearing when



CUTTERS

For Flat Bars Rods • Angles Wire Rope

MADE IN THREE SIZES:

Circulars available on our cutters, punches, and benders.

T. H. LEWTHWAITE MACHINE CO. 317 East 47th St. New York 17

Oliver" Cut-Off Saw

cuts mouldings, tubes, strips of metal and compositions . . . and accurate to .005 inch!



An excellent production machine that has proved itself in leading industrial plants. Makes straight or angle cuts with saw or cut-off wheel. Selfcontained and compact. Operates lightly with no rebound. Fully safeguarded. Cuts thousands of pieces without variation of .005 inch. Built to give long service and smooth operation.

Write for Bulletin 94-DM OLIVER MACHINERY CO.

Grand Rapids 2, Mich.



Checking a Ring Gear Using Sheffield Spider Type Gaging Spindle Connected to Preci-sionaire Flow Type Air Gage

the spindle is presented has been developed by The Sheffield Corp., Dayton 1. Ohio. The spindle is used with the Precisionaire, a flow type air gage for checking internal diameters, bell mouth, outof-round, and the average diameters.

The spindle is said to enter shallow holes with maximum ease regardless of the manner in which it is presented to the part. Light in weight, the spindle can be handled continuously without undue fatigue, making possible a reading with accuracy entirely unaffected by relatively rough surface finish, it is stated. Connected to the instrument by a flexible hose, the spindle is balanced for complete rotational accuracy, and diameter locating surfaces are faced with tungsten carbide so as to provide for maximum wearing life.



illustrated folder.

Immediate Delivery

Write for

outstanding features -Wheel is dressed from below, avoids removal of guard. Stop pins permit totation thru 180° or 90° either direction. Wearever bearing is dustproof.

Thou-ands of Somerset

Dressers in service. Offer

SAVES TIME

320 Virginia St. SOMERSET TOOL CO. Hillside, N. J.

September, 1949

Steel Hardening Compound

Known as "Hard'N'Tuff," a compound for hardening steel tools, parts, and dies to any desired depth in a matter of minutes without the use of special equipment is being marketed by Doughty Laboratories, Inc., 307 E. 44th St., New York 17, N. Y. Designed to eliminate distortion, the compound is supplied in powder form in 3, 5, and 10-lb. containers and in 25, 50, and 100-lb. drums.

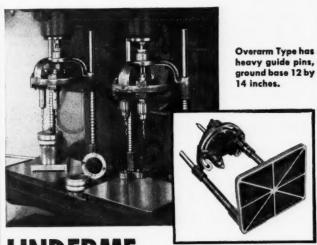
To use, the object to be hardened is first heated in a forge, heat controlled furnace, or with a torch until it is cherry

(about 1,700 deg. F.) and is then quickly dipped or rolled in Hard'N'-Tuff. The object is next exposed to the air for 15 to 30 seconds, depending upon the size, to allow the compound to impregnate the molecules of the metal, thereby effecting a complete molecular change. The object is then reheated so that the Hard'N'-Tuff will thoroughly fuse into it. When the object is again cherry red, it is quickly quenched in clear cold water or brine, after which it is wiped off with a rag or wire brush.

If a greater degree of depth of hardness is desired, the same steps described above are followed up to the quench. However, before quenching the object, it is dipped or rolled a second time in Hard'N'Tuff and held for 15 to 30 seconds in the air as previously. Following this the object is again heated to a cherry red color and, while the Hard'N'Tuff is still bubbling in the fusing process, the object is quenched.

Four-Way Air Control Foot Valve

The Logansport Machine Co., Inc., Logansport, Ind., announces a foot-operated four-way air control valve, designated as the Model 6552, which is built in %, %, and 1-inch port sizes and is designed for pressures up to 150 p.s.i. Features include compact design; self-cleaning construction; easy-operating foot pedal; full pipe size ports and internal air passages to permit unrestricted air flow; valve cover which may be rotated 90 to 180 degrees to simplify piping



LINDERME 2-Spindle Head

"increased production from 160 to 600 an hour"

This story is typical of the many applications of Linderme 2-spindle drill heads on long and short runs. You'll like these features: drills, taps—in metal, wood, plastics; quick, accurate adjustment, ½" to 6" centers; two minute set-up on most drill presses in

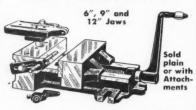
your shop; anti-friction bearings, rugged gearing, quality machining—and Linderme's low initial cost for Overarm or Sleeve Types—Twelve models, capacities up to %", available with G.M. Sleeves or Morse Tapers. Write for complete catalog.

LINDERME MACHINE AND TOOL CO., INC.

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Multi-purpose—shown above, with many attachments optional, saves untold tool-making hours by serving as a ready-made jig and fixture.

Centering—both jaws move toward center, at double-fast rate. Centers work of varying sizes.

Swivel—with exclusive Adjustable Zero Pointer. Drilled to take Attachments if desired.

Request Illustrated Price Bulletin 44

GRAHAM MFG. 37 Bridge St.

Monarch Precision SHAPLANE Radius Tools



Five Models for

LATHES, SHAPERS, PLANERS, AND BORING MILLS.

RANGE 1/2" TO 3" RADIUS (MODELS ALSO AVAILABLE FOR CONVEX CUTTING, AND CONCAVE RADII TO 6" ON PLANERS, ETC.)

C. B. TEETER
Tool Room Specialties
4470 Oakenwald Ave., Chicago 15, Ill.
Phone Drexel 3-3571



Logan Model 6552 Air Control Valve

problems; and synthetic cup packings.

Unusually easy to repair or recondition, the valve has a body and cover made of high tensile cast iron. The foot pedal is of manganese bronze.

Boring and Facing Toolhead

A toolhead for boring, facing and grooving operations is being offered under the designation Chandler-Duplex by the Chandler Tool Co., 514 Ohio Ave., Muncie, Ind. The head is provided with power feed for facing cuts, as well as with positive stops to limit slide travel. The shank is interchangeable, with all types available.

The Chandler-Duplex Toolhead is made in six sizes for use in small, medium and semi-heavy, and heavy type machines.



Chandler-Duplex Boring and Facing Toolheads

/4-Inch Electric Drill

Built with surplus power for production drilling in metal and other materials, a lightweight 4-inch electric drill identi-



Stanley No. 24A Electric Drill

fied as the No. 24A is announced by Stanley Electric Tools, 520 Myrtle St., New Britain, Conn. The tool has a no-load speed of 1,800 r.p.m. and a full-load speed of 1,100 r.p.m.

Construction features include a strong aluminum alloy die-cast housing; helical gears; oil impregnated bronze bearings; 3-jaw Jacobs chuck; trigger type switch with locking device; and rubber-covered 3-wire cord with ground connection.

Micrometer Adjusting Nut

The Gairing Tool Co., P. O. Box 478, Roosevelt Park Annex, Detroit 32, Mich., announces a micrometer adjusting nut known as the Ful-Grip Micro-Nut. Recommended for individual tool adjustment on multiple spindle setups, the nut may be used on threaded adapters and holder assemblies with or without keyways. Adjustment is guided by 0.001-inch graduations.



Gairing Ful-Grip Micro-Nut

The set screw of the nut provides for a full all-round grip on the threads by moving the top and bottom parts of the nut in opposite directions.



 Completely automatic — one operator tends 6 or more presses.

IT PERFORATES

- High speed production 9,000 to 40,000 pieces per hour.
- Cuts light metals and other materials in lengths to 9 inches.
- Low tooling costs.

WRITE FOR INFORMATION A PRODUCT OF

Ace Tool & Die Works

129 E. McMicken Ave. Cincinnati 10, Ohio

Ball Bearing Units

A series of ball bearing units for medium loads and shaft speeds up to 1,000 r.p.m. is being offered by the Roberts Machine Works, 1619 Hennepin Ave., Minneapolis 3, Minn. Both pillow blocks and flange units are available in sizes for shafts from ½ to 1½ inches in diameter.

The one-piece housings for the ball bearing units are of heavy duty cast iron. The units are equipped with grease fittings and felt seals which retain the lubricant while protecting against the entrance of foreign matter. The units are



Roberts Ball Bearing Unit

designed to allow for normal misalignment of the shafts. Bearings move in alloy steel races, and the inner race is locked on the shaft by two set screws spaced 90 degrees apart.

Rotary Carbide Cutters

To meet the demands of manufacturing operations such as filing, burring, grinding, finishing, countersinking, chamfering, light milling, profiling, and tool, die and mold machining, The M. A. Ford Mfg. Co., Inc., Davenport, Iowa, has an-



Ford Rotary Carbide Cutters

nounced the increase of its line of rotary carbide cutters to over 40 standard shapes.

Real Spring Winder!



Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the

ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

like it and the price is reasonable.

No. 1 Capacity O thru 3/32" wire \$1.50

No. 2 Capacity O thru 3/16" wire \$3.00

No. 3 Capacity O thru 5/16" wire \$5.00

HJORTH LATHE & TOOL CO.

10 BEACON STREET WOBURN, MASS.

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MODERN MACHINE SHOP

will preview

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PERFECT PROTECTION
AT LOW COST!

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standhardwear. • Resist Water, Alcohol, Oils, Paints and Acids, • Clean easily with damp cloth. No laundry bills. • Available in transparent and colors. • Write for circular and prices!

Inquire about plastic shop work envelopes and machine dust covers.

FORBES PRODUCTS CORPORATION 629 S. Goodman St., Rochester 7, N. Y

Tap Holder

Described as ideal for close-center multiple tapping operations, the "Tool-flex" Tap Holder illustrated herewith, product



"Tool-flex" Tap Holder

of the Burg Tool Mfg. Co., Dept. MMS, 3743 Durango Ave., Los Angeles 34, Calif., is designed to tap holes up to 10-24 in steel at % inch center to center. Neoprene mounting is said to compensate for both parallel and angular misalignment and prevent broken taps, bellmouthed and torn threads.

The holder is available with shanks to meet user specifications.

Serrated Milling Cutter Blade

Kennametal Inc., Latrobe, Pa., is manufacturing a serrated milling cutter blade having a brazed-on Kennametal tip. The blade is produced to specifications in a wide variety of forms, and can be furnished ground with any of the common



Kennametal Serrated Milling Cutter Blade

types of serrations such as 90 degree, 60 degree, or with combination plane and serrated surfaces.

SAVAGE

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Ask for Free Bulletin "H"



Capacity 3/4" mild steel

FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEM-PLATE OR TO A SCRIBED LINE.

Manufactured by

W. J. SAVAGE COMPANY Knoxville

Tennessee Since 1885

Pioneer Mnfrs. of Nibbling Machines

HYDRO - PRESS \$84.00

FIVE TONS of smooth power is at your service with this compact and versatile tool.

The perfect press for garage, electric motor shop, refrigerator repair and machine shop.

Will operate lying horizon-

Ram has removable anvil and retracts itself when released. Weight 100 lbs. Stroke 51/2". Height 53". Width inside 16".



ARTHUR J. HURT & CO.

360 South Navajo Street Denver 9, Colorado

New Films

"Meet King Joe"

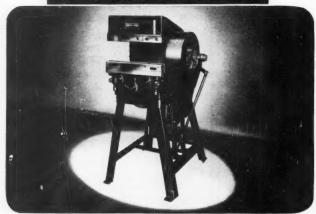
"Meet King Joe," another in the Hard-ing College series of Technicolor ani-mated motion pictures, is being released throughout the theaters of the nation via Metro-Goldwyn-Mayer. As dramatically illustrated in the film, "Joe" is the king of the workers of the world because of his shorter working hours and his higher pay, which makes it possible for him to maintain the finest living standard in the

world-thanks to the American economic system. Specific dates as to when the picture is booked for specific theaters in your city and surrounding cities can be obtained by contacting the nearest Loews, Incorporated office (Metro-Goldwyn-Mayer's distributing office) to your location.

Controlled-Air-Power Film

A 16 mm. black-and-white sound motion picture released by The Bellows Co.,

WHITNEY METAL YEARS EXPERIENCE



WHITNEY-JENSEN No. 247 PRESS BRAKE

Production shops turning out quantities of small formings in large presses and job shops requiring a small brake, will find the No. 247 a cost reducing, space-saving piece of equipment. Capacity of the machine is 14 ga. mild steel over 1/8" 90° V die or 41/2 tons. Strokes per minute — 47

WHITNEY METAL TOOL COMPANY 110 FORBES STREET, ROCKFORD, ILLINOIS

Dept. MMS, 222 W. Market St., Akron 9, Ohio, is a case history film showing the use of "controlled - air-power" in effecting cost reductions in various manufacturing processes. The 28minute film, titled "Production Miracles Through 'Controlled-air-Power'," includes actual production scenes showing in detail how the application of Bellows controlled-airpower devices to standard and custom-built machine tools increased production and reduced fatigue in such operations as milling, drilling, tapping, grinding, and so on.

The film is available without charge to plant executives for showing in their own plants.

Please mention MODERN MA-CHINESHOP when writing to advertisers. Your cooperation will be appreciated both by the advertisers and the publisher of this magazine.

New Books

Constructive Uses of Atomic Energy. By S. C. Rothmann. Published by Harper & Brothers, 49 E. 33rd St., New York 16, N. Y. 258 pages. Illustrated. Cloth bind-

ing, board covers. Price, \$3.00.

Written for the layman in non-technical language, this book contains articles by 14 eminent scientists describing the everyday usefulness of atomic energy in such fields as industrial power, aviation, ceramics, and chemical, biological, medical, and pharmaceutical research. The

subject matter is illustrated by photographs and drawings that still further illuminate the tremendous potentialities atomic energy for good as well as evil ends. For the non-scientific reader, a useful glossary is provided, defining in easily-understood terms the new words and phrases nuclear energy has added to the English vocabulary. A selected bibliography lists recent publications as a guide to further reading in the

Diamond Tool Patents Ia (for Machining Metals and Non-metallic Substances). Second, Revised Edition. By P. Grodzinski and W. Jacobson. Published by Industrial Diamond Information Bureau, 32-34 Holborn Viaduct, London E.C.I. England. 55 pages. Heavy paper covers. Price, 10 shillings (approximately \$2.00 U. S. Currency).

This edition of "Diamond Tool Patents" has been considerably enlarged over the first edition which was published in 1945 and contained a survey of 98 patent specifications in the diamond tool field. The new edition includes over 200 patent specifications, as well as an appendix containing some 20 specifications on machines and equipment for shaping industrial diamonds.

Proceedings of Fifth Annual Meeting of Metal Powder Association. Published by Metal Powder Association, 420 Lexington

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This quick, low cost Steel Hardening Compound is the result of 2 years research by America's foremost Industrial Chemist, Dr. Foster Dee Snell. It is backed by our UNCONDITIONAL GUARANTEE, and 51/2 years experience in this particular field.

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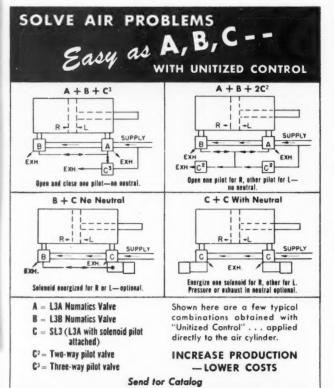
Ave., New York 17, N. Y. 116 pages. Illustrated. Price, \$3.00.

This booklet incorporates the proceedings of the Fifth Annual Meeting of the Metal Powder Association held in Chicago in April. Included is an informal open discussion of powder metallurgy by lead in g powder metallurgists, metal powder producers, and parts fabricators, as well as the following papers: "Some Effects of Oxygen On the Performance of Iron Powder," "Tolerances of Finished Metal Powder Parts," "Hygiene in the Metal Powder Industry," "Selling Parts Made from Metal Powders," "Ef-

fects of Impurities in Metal Powders,"
"Powder Metallurgy from the Design
Engineer's Viewpoint," and "Characteristics of Materials Involved in the Magnetic Fluid Clutch."

Bottom-Up Management. By William B. Given, Jr., president of American Brake Shoe Company, New York, N. Y. Published by Harper & Brothers, 49 E. 33rd St., New York 16, N. Y. 171 pages. Price, \$2.50.

This volume leaves to foremen superintendents, and intermediate executives the basic job of devising work methods to excute top management policy. The warm, human philosophy which is typified in the book is the result of the author's many years of personal experience in giving his supervisory people maximum freedom. The author presents his case for allowing initiative up and down the line by explaining the workability of the system in his own company. By analyzing procedures and mechanisms and by using human experience as illustration, he shows that his plan is flexible enough to readily apply to various other kinds of businesses.



100 SOUTH MAIN ST. . MILFORD, MICH.

Please mention MODERN MACHINE SHOP when writing to advertisers. Your cooperation will be greatly appreciated both by the advertisers and the publisher of this magazine.

New Shop Literature

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning MODERN MACHINE SHOP when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

"The Method X Process Transforms Hard Carbides into Accurate Shapes" is the title of a four-page folder issued by The Method X Co., Chalfont, Pa., which presents data on the advantages and limitations of an electrochemical process for machining carbides.

Bolster Plates. Dimensional data on press bolster plates standardized in accordance with Joint Industry Conference specifications to facilitate die interchangeability are included in an eightpage three-color illustrated and descriptive folder offered by Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Illinois.

Weldirectory for Cast Iron. A fourpage illustrated bulletin (No. 465) covering shielded arc electrodes for welding cast iron has been released by The Lincoln Electric Co., Cleveland 1, Ohio. Data on procedure for arc welding cast iron are included.

Renewable Fuses of the "Bare-Link" and "Powder-Packed" types are fully illustrated and explained in a 24-page pocket-size booklet distributed by the Trico Fuse Mfg. Co., Milwaukee, Wisconsin.

Taper Bridge Reamers, both long and short set, for use in pneumatic tools for boiler, bridge, ship, and structural iron work are illustrated and listed as to sizes and prices in a four-page catalog supplement published by the National Twist Drill & Tool Co., Rochester, Michigan.

Duplex-Control Slotters are shown, described, and covered as to specifications in a six-page folder now available from the Jones Machine Tool Works, Inc., King of Prussia, Pennsylvania.

New AUTODRILL

A Production Machine Tool

6 IMPORTANT ADVANTAGES

- 1. Variable Spindle Speed
- 2. 4" Stroke (or more)
- 3. Rapid Spindle Travel to Work
- 4. Accurate Depth Stop
- 5. Controlled In Feed
- 6. Rapid Withdrawal

(Dealers—Some desirable territories still open) Write for Complete Circular

Auto Tool & Engr. Co., 2908 Armitage, Chicago 47, III.



To Drill, Ream, Bore, Spin, Etc.—Also Tapping

Drill Case, especially designed for the storing of small twist drills, is fully illutrated and described in a four-page pamphlet released by the Union Twist Drill Co., Athol, Massachusetts.

Wheel Forming Attachment for the precision dressing of grinding wheels for accurate form grinding in solid hardened steel is described and illustrated in an eight-page circular released by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Connecticut.

Molds and Dies. The Parker Stamp Works, Inc., 650 Franklin Ave., Hartford 1. Conn., has available a four-page twocolor catalog (No. 49) illustrating and describing plastic molds, die casting dies, and facilities for designing, engineering, building, machining, engraving, heat treating, and polishing these various products.

Petroleum Dispensing Equipment. The Phillips Pump & Tank Division, Steel Materials Corp., 5050 Brotherton Rd.,

Cincinnati 9, Ohio, has prepared a 24page three-color catalog (A-48) illustrating and describing a complete line of petroleum dispensing products, including lubricating oil dispensers, gasoline

and kerosene tank units, grease dispensing outfits, and rotary pumps. Precision Drill Table, particularly useful in the drilling of small deep holes such as required in many piercing dies, and so on, is illustrated and described in a

four-page twocolor folder issued

by the Brickner-

Kropf Machine Co.. Muskegon Hts., Michigan.

Car Wheel Lathe. A four-page twocolor booklet published by The Bullard Co., Bridgeport 2, Conn., illustrates and explains the Bullard 54-Inch Man-Au-Trol, including its use in the predeterm i n e d automatic machining of car wheels.



Automatic Cycle and Sizing Arrangement for Brown & Sharpe plain grinding machines is illustrated and described in a series of catalog sheets available from the Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Centrifugal Switches. A line of pilot circuit switches for machine tools, process rolls, conveyor systems, fans, motors, and so on, is illustrated and described in a four-page two-color bulletin (No. 1001) released by The Euclid Electric & Mfg. Co., Madison, Ohio.

"How to Repair Broken Cutting Tools with Easy-Flo Silver Brazing Alloy" is the title of Bulletin No. 14 offered by the Central Steel & Wire Co., P. O. Box 5310-A, Chicago 80, Illinois.

Indicating Gages. A four-page twocolor brochure describing and illustrating a line of Superbronze Non-Corrosive Indicating Gages is available from the Star Brass Division, Williams & Hussey Machine Co., Wilton, New Hampshire. Heavy Duty Electrical Contacts. The use of "Fastell," a versatile group of materials made from metal powders, for electrical contacts is illustrated and explained in a 12-page technical data bulletin (7.101) issued by the Fansteel Metallurgical Corp., North Chicago, Illinois.

32-Inch Diameter Solid Carbide Mills for the manufacture of jewelry, diesel injectors, aircraft parts, dies, molds, metal patterns, and so on, are described, illustrated, and priced in Bulletin 17-CM distributed by Severance Tool Industries, Inc., 724 Iowa St., Saginaw, Michigan.

Standby Power Plants. A catalog sheet (Form 449-SB) on Katolight power plants for emergency or standby service is being distributed by the Kato Engineering Co., Mankato, Minnesota.

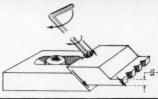
Gradiation Brazing Machines are described and illustrated in an eight-page bulletin (No. 497) issued by the Selas Corporation of America, Erie Ave. & D St., Philadelphia 34, Pennsylvania.

Save time and money with these new side gripping self-locking jaw clamps

• J & S Jaw Clamps hold all sizes and shapes of work pieces tightly against face plates of machine tools. Clamp is self-locking and full surface of work %" high or over may be machined without interference, because the jaws grip the work-piece on the sides. These Clamps facilitate controlled centering adjustment—secondary operations are unnecessary—they eliminate different length studs and blockings — tested for two-ton down pressure. Send for details.







Also Manufacturers of Fluidmotion and Form-Master Wheel Dressers and Special Form-Grinding to Specifications

"FLINT"

MAGNESIUM SAFETY TONGS

The Answer to Safety and **Efficiency in Punch Press** Operation

- · light as cardboard.
- durable as steel.
- minimum injury to dies when caught in press.
- · minimum fatigue.
- maximum safety to operator

Because of the inherent lightness of Magnesium, it is now possible to make these tongs long enough to keep the worker's hands completely out of danger. Particular attention is given to the hand grip on all tongs to insure against abrasions when used on highly repetitive work.



No. 555

Length 101/2 in. Wt. 5 oz.



Length 111/2 in. Wt. 5 oz.



Length 111/2 in. Wt. 61/2 oz.

No. 333

Length 101/2 in. Wt. 61/2 oz.



Very low price in quantities. Write direct for catalog and prices if your

regular supplier does not handle. Dealers wanted.

NORTHERN TOOL & DIE ENGINEERING

FLINT 5, MICHIGAN

"For Uniformity of Size and Maximum Grinding Efficiency" is the title of a fourpage two-color catalog section prepared by the Brown & Sharpe Mfg. Co., Providence 1, R. I., which illustrates and describes an automatic cycle and spark-timing arrangement for Brown & Sharpe plain grinding machines.

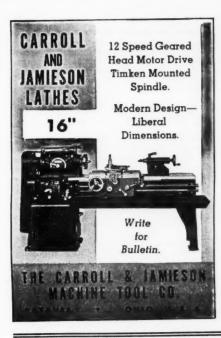
Alloy Steels. Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 42, Mass., announces a revised edition of its alloy steel data catalog which includes complete information on Hy-Ten, A.I.S.I., and S.A.E. alloy steels, such as qualities, heat-treating instructions, physical properties, sizes, applications, and so on.

Heavy Duty Lathes are described and illustrated in a 36-page bulletin published by The Monarch Machine Tool Co., Sidney, Ohio. A number of duplicating devices, which are features of the lathes, are also covered.

Press-Rebuilding Service. A 12-page bulletin (R-49) issued by the Verson Allsteel Press Co., 9310 S. Kenwood Ave., Chicago 19, Ill., presents detailed descriptions of the company's facilities for rebuilding presses and shows typical assemblies of presses rebuilt by Verson.

Collets and Special Tools. A 24-page catalog (No. 17) issued by the Sutton Tool Co., Sturgis 2, Mich., illustrates and describes many special tools, such as expanding mandrels, special spring chucks, milling machine adapters, special collets, sleeves, and chuck jaws, in addition to the Sutton standard line of screw machine collets and feed fingers. Specifications and list prices are included.

Midget Mills. Severance Tool Industries Inc., 724 Iowa St., Saginaw, Mich., has available a 32-page catalog (No. 17) which contains complete data, including pertinent technical information, on an extensive line of midget mills that is divided into four groups: midget mill group, deburring group, tubing cutter group, and countersink group. Various miscellaneous tools are also covered.







Dead-Weight Gage Tester. A four-page two-color brochure describing and illus-Tester has been released by the Star Brass Division, Williams & Hussey Machine Co., Wilton, New Hampshire.

Live Center. A two-color bulletin pre-pared by L. F. Treichler, 900 Route 29, North Plainfield, N. J., illustrates and describes a needle bearing spring-loaded live center for both heavy roughing cuts and high precision work on lathes.

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries. BLOOMFIELD TOOL CORP. BLOOMFIELD, N. J. 37 FARRAND ST.

ONE MAN CAN LIFT OR CARRY 750 LBS. WITH

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TABLE Constructed of steel throughout. Jack

can be removed in

a few minutes. Ideal

for machine shops,

tool rooms, etc.

One man can easily do the following:

remove dies from storage shelves carry and place them on shelves; support and level

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Clutch Speed Counter for quickly checking revolutions to determine speeds of motors, generators, machinery spindles, line shafting, grinding wheels, saws. lathes, and so on, is illustrated and described in a four-page pocket-size folder issued by Veeder-Root Co., Hartford 2, Connecticut.

Portable Cranes. A complete line of portable cranes for shipping, unloading, and stacking operations is illustrated and described in a four-page bulletin prepared by the Grand Specialties Co., 3135 W. Grand Ave., Chicago 22, Illinois.

Core Drill Cutter, available in 25 sizes for enlarging holes, is illustrated, described, priced, and listed as to specifications in a four-page folder published by Scully-Jones & Co., 1909 S. Rockwell St., Chicago 8, Illinois.

Blanks for Pulley Grooving Tools and Lathe Centers. Supplement No. 8 to its tool catalog, listing sizes and prices of its new line of standard blanks for pulley grooving tools and improved, heavier duty lathe and grinder centers, has been issued by the Carboloy Co., Inc., 11143 E. 8 Mile Rd., Detroit 32, Michigan.

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Vertical Hydraulic Presses for broaching, forcing, straightening, staking, assemblying, and general purpose work are illustrated and described in Bulletin P-49 distributed by the Acme Broach Corp., Milan, Michigan.

Boring Tools. An eight-page price list and catalog on single point solid rod boring tools has been prepared by the Industrial Carbide Tool Co., 33 Hermon St., Worcester, Mass. Reference charts for boring tool applications are included.

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Abrasive Wheel, known as the Fibrex Red Wheel and available in a depressed center type for wheel grinding and metal finishing and a straight type for cuttingoff operations and all-purpose use, is covered in detail in a four-page two-color bulletin (No. ESA-186) published by the Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pennsylvania.

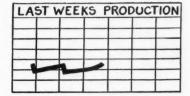
Laboratory Apparatus and Accessories. A 32-page two-color catalog (860NR) published by the Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill., illustrates and describes a complete line of laboratory apparatus and accessories for the preparation of metallographic specimens.

"The Inside Story of Allis-Chalmers 'Safety-Circle' Motor Protection" is the title of an eight-page bulletin (51B6210B) released by the Allis-Chalmers Mfg. Co., 1010 S. 70th St., Milwaukee, Wisconsin.

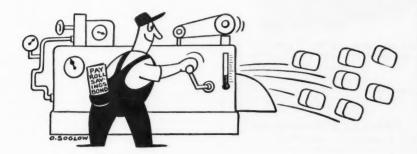
Automatic Chuck. The Whiton Machine Co., New London, Conn, has released a four-page two-color bulletin (A-1) illustrating and describing its "Air-O-Torque" Chuck, a heavy duty power chuck with a through center hole.

Engraving Machine. The Micro Engraver Model 253 for engraving on work up to 19 inches high is illustrated and described in a four-page folder issued by the Micro Instrument Co., 80 Trowbridge St., Cambridge 38, Mass. Also shown and described is a cutter grinder for all types of engraving cutters, as well as an ex-tension arm assembly and copy carriers for engraving machines.









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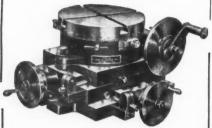
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A Division of U. S. Burke Machine Tool Co. 22 East 72nd St. Cincinnati 16, Ohio Visual Oilers. An eight-page two-color bulletin distributed by the Gits Bros. Mfg. Co., 1846-86 S. Kilbourn Ave., Chicago 23, Ill., presents illustrated, descriptive, and tabular information on a line of visual oilers, including automatic multiple oilers, vibrating rod oilers, gravity feed and wick feed oilers, and constant level oilers.

Right Angle Rotary Actuator. Airborne Accessories Corp., 25 Montgomery St., Hillside 5, N. J., has issued a four-page two-color bulletin illustrating and describing an improved electrically powered right angle type rotary actuator designed for intermittent duty aircraft applications, as well as industrial applications.

Hydraulic Straightening Presses in 15, 25, 35, and 50-ton capacities are illustrated and fully described in a four-page three-color circular (No. 215) issued by the American Broach & Machine Co., Ann Arbor, Mich. The back page contains a two-color drawing and a specifications chart listing all dimensions of the four sizes of presses.

Welding Equipment. The Modern Engineering Co., Dept. 136, 3415 W. Pine Blvd., St. Louis 3, Mo., has issued a profusely illustrated catalog (No. 140) covering every type of welding equipment necessary for all acetylene and oxygen operations.

Miniature Variable-Ratio Speed Changer is the subject of Bulletin No. 99 issued by the Metron Instrument Co., 432 Lincoln St., Denver 9, Colorado.

Testing Machine for testing films, fiber, strip, rubber, fine wire, leather, and other materials is fully illustrated and described in a four-page two-color bulletin (No. 37) released by the Tinius Olsen Testing Machine Co., Easton Rd., Willow Grove, Pennsylvania.

Non-Rotating Air Motors. A 16-page 3-color bulletin (BM2OR) released by The Bellows Co., Dept. MMS 549, Akron 9, Ohio, illustrates and describes various type of non-rotating air motors and air motor accessories.

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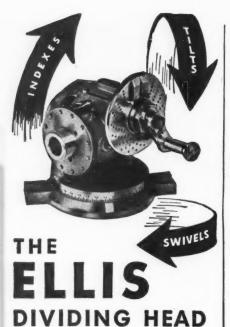
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Straightening Presses. A short cut in the straightening of large weldments, structural shapes, forgings, castings, and plates is described in a four-page illustrated bulletin (No. 4902) released by The Hydraulic Press Mfg. Co., 1048 Marion Rd., Mt. Gilead, Ohio, which introduces the new H-P-M two-way all-hydraulic straightening presses for multiple straightening operations.

Tap Holder of the releasing type which may be readily adapted for either right or left-hand tap operation is illustrated and described in a four-page two-color folder (No. M1) issued by The Marcellus Mfg. Co., Belvidere, Illinois.

War Surplus Equipment. The Acme Equipment Co., Inc., 126 S. Clinton St., Chicago 6, Ill., is distributing a 28-page bulletin (No. 92) containing illustrated, descriptive, and price information on war surplus industrial items, including fire extinguishers, lift trucks, hoists, cranes, materials handling equipment, machinery, special equipment, and miscellaneous items.

Honing Process Publication. The Micromatic Hone Corp., 8100 Schoolcraft, Detroit 4, Mich., announces a publication known as "Cross-Hatch" which will be issued at two-month intervals and will be devoted to providing factual information regarding the Microhoning process of stock removal.

Airflow Column Type Inspection Devices. A 28-page two-color catalog (CTP-491) announced by The Sheffield Corp., Dayton 1, Ohio, illustrates and describes various standard models of Sheffield Airflow Column Type Precisionaires, as well as numerous special applications.

Generators. The Kato Engineering Co., 1415 First Ave., Mankato, Minn., has issued two illustrated bulletins on generators. Bulletin No. 3149 describes a.c. generators ranging in capacities from 15 to 175 kw. at 60 cycles and with speeds from 720 to 1,800 r.p.m. Bulletin No. 21749 describes a.c. generators ranging in capacities from 150 to 300 kw. and with speeds from 720 to 1,800 revolutions per minute.



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Vibration Control. Designed for controlling the transmission of vibration and noise, a cork and rubber mounting for machine tools, compressors, generators, fans, pumps, and so on, is described in a four-page illustrated catalog (ER-701) released by The Korfund Co., Inc., 48-39-S 32nd Pl., Long Island City 1, New York.

Soldering Fluxes, known as "Flosol" and designed for use in the soldering of sheet metal and other products constructed of carbon and stainless steels, brass, copper, tin, terne plate, zinc, and galvanized iron, are the subject of Technical Service Data Sheet No. 5-2 released by the American Chemical Paint Co., Ambler, Pennsylvania.

Variable Speed A.C. Drive. A 12-page bulletin (No. 611-D) illustrating and describing an alternating current motor having infinitely adjustable speed has been published by The Louis Allis Co., 427 E. Stewart St., Milwaukee 7, Wis.

Adjustable Hole Lap, product of the Brickner-Kropf Machine Co., Muskegon Hts., Mich., is fully described in an eight-page two-color illustrated bulletin released by this firm.

"Three Keys to Satisfaction" is the title of a 70-page booklet published by the Climax Molybdenum Co., 500 5th Ave., New York 18, N. Y., which discusses the relation between the design of parts and the choice of steel and its treatment.

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Automatic Gear Cutting Machine for spur, bevel, and worm gears is described and illustrated in Bulletin G-1 available from The Whiton Machine Co., New London, Conn. Copy free.

Rust Preventives. A 16-page illustrated booklet issued by the Esso Standard Oil Co., 15 W. 51st St., New York 19, N. Y., contains detailed recommendations for the selection of rust preventives, as well as other pertinent information on the use of these coatings for eliminating rusting of unfinished parts during manufacture or equipment in transit. Copy free.

Fuses, Fuse Clip Clamps, Test Clamps, Fuse Pullers, Lubrication Devices and other products are illustrated and described in a four-page two-color broadside (No. 300-A) issued by the Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis. Copy free.

Internal Locking Adjustable Gage Stop which can be adapted to all types of dies requiring gages is the subject of a descriptive and illustrated bulletin distributed by the Brickner-Kropf Machine Co., Muskegon Hts., Mich. Copy free.

9-Inch Metal Cutting Saw, product of W. F. Wells & Co., North on U. S. 131. Three Rivers, Mich., is illustrated and described in a four-page two-color folder prepared by this firm. Copy free.



Segmented Grinding Chucks for vertical spindle surface and horizontal spindle face grinding are described and illustrated in a four-page two-color folder prepared by Abrasive Associates, 1216 Industrial Trust Bldg., Providence 3, R. I. Copy free.

Non-Scaling Compound for hardening and annealing steel is described in a twocolor leaflet prepared by The Parker Stamp Works, Inc., 650 Franklin Ave., Hartford 1, Conn. Copy free.

Burr Removing and Chamfering Tools are shown and described in a four-page two-color bulletin (No. 265) issued by the Nobur Mfg C., 717 N. Victory Blvd., Burbank, Calif. Copy free.

Electronic Motor Control for the remote, stepless speed adjustment and control of fractional horsepower motors is illustrated and described in a two-color bulletin (No. 860) issued by The Brown-Brockmeyer Co., Dayton 1, O. Copy free.

"Time Savers" is the title of Bulletin 4881 published by the Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill., which presents illustrations, descriptions, and prices pertaining to hand trucks, barrel trucks, pickup pallets, chisel trucks, recker racks, carbov pourers, skids, die tables, stacking frames, bar stock reels, lifter and skid systems, rectangular and triangular dollies. Copy free.

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Over the Editor's Desk

Let's Learn from Britain

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AST AUGUST this column printed an article on Britain's experimentation with the idea of legislated prosperity. At that time we said that the unfortunate results of the experiment should serve as a warning to the starry-eyed economists in America who do not realize that when the state begins to assume the role of God, the material welfare of the people is bound to suffer, and that for its own safety America should be sure to watch what is going on across the Atlantic in order that we might avoid pulling a similar boner over here.

We think the time has come for another chapter in Britain's progress under Socialism.

Four years ago the British working man voted himself relief from the trials and tribulations of capitalism. Laws were passed guaranteeing prosperity and security to the workers, to be paid for out of taxes. The only catch was that prosperity does not come from passing laws: It comes from producing more goods and services. Unfortunately this truth was not given proper emphasis in the British plan, which started out to simply change the distribution of what was being produced by means of legal confiscation.

For four years this confiscation did have a small effect upon the welfare of the very poor people, but now comes the realization that there is no more to take from the well-to-do, and the people who are supposed to have benefited are still suffering from the same troubles that were supposed to have been eliminated by the passing of laws to "soak the rich."

The fact that the rich have no more to be taken away was announced by Sir Stafford Cripps last month in his budget message when he said that the "very great and highly desirable redistribution of wealth has already taken place," and added, "There is not much more immediate possibility of the redistribution of the national income by way of taxation in this country. We must rely, rather, upon the creation of more distributable wealth than upon the redistribution of the income that exists."

In the meantime, the so-called "free" social services that the British people voted themselves require that the government take a whacking slice of their income in order to supply the "free" services.

To say that the British people are disappointed in their experiment is an under-

statement: They have finally learned that they are paying for a ride on their own horse; that everything the government gives them is first taken away from them.

Sir Stafford Cripps spoke for four hours before Parliament, and it must be admitted that he handed out the bad news with much more courage than the average politician usually shows. He let them have it with remarks like this: "When I hear people speaking of reducing taxation and at the same time see the costs of social services rising rapidly in response—very often—to the demands of the same people who want taxes reduced, I sometimes wonder whether they appreciate the old adage, "We cannot have our cake and eat it too."

There is evidence, however, that common sense is filtering into the British socialist policy. In order that industry may have more money for the installation of new plants and machinery, the government has reduced industry's taxes by 75 million pounds. At a time when the personal income tax rate is 45 per cent for the poorest, and the surtaxes run from 10 per cent to $52^{1/2}$ per cent, it is an act of great political courage to reduce taxes on corporations, but it does indicate that the Labor Government is learning the facts of economic life and is honest enough to admit it.

However, the plight of the British is a very unhappy one. The fact is that the cost of government has now reached 40 per cent of the national income. The "London Economist" recently stated in an editorial: "Even though every item of government expenditure is approved in detail any such rate of taxation, if continued for long, will be disastrous to the national economy.

"Any economy that depends to any extent at all upon individual efforts and initiative must have some system of incentives and rewards. The Soviets, who depend less on individual efforts than the British system does, have long ago admitted the truth of this. Idealists may dream of a state of affairs in which something other than individual material gain provides sufficient motive power to run the national economy, but those days have not yet appeared."

It should also be mentioned that the lack of success of the British experiment in having the government take care of all the people's problems would have been much more pronounced had it not been for the billions of dollars of aid which America poured into Britain during the last four years. Although no one would begrudge the exhausted Britains this postwar aid, it is in a way unfortunate that it served to bolster up the Labor Party schemes and make them look far more workable than they really are.

There seems no doubt that in the near future the British people will want to unravel their snarled-up economic affairs and resume the responsibility of taking care of themselves instead of having the government do it for them. There is grave doubt, however, that they will be able to do so, because it is much easier to take a clock apart than it is to put it back together again. The system that made Britain a great and prosperous nation has been pretty well dismantled, and it would be a Herculean effort to restore it.

America should watch these efforts with a sympathetic and, if possible, helpful attitude, but by all means America should watch it with a determination not to make the same mistakes. If what Britain has done keeps America from doing the same thing, it will be worth all the money we have given her.



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